American Foundryman

AMERICAN FOUNDRYMEN'S ASSOCIATION
FOUNDED 1896

A PUBLICATION PERTAINING TO ASSOCIATION AND CHAPTER ACTIVITIES

November
1941

Industry Shows

INDUSTRY SHOWS are recognized as a most effective means of sales promotion, combining the scattered efforts and expenditures of many into one strong effective push. Exhibits expedite the function of specialized groups by the gathering of large numbers of people at one time, providing a most effective means of disseminating a vast amount of information through the exchange of ideas and the inspection of various devices, materials and equipment as aids to production.

Exhibits reach the policy-forming executive more effectively than any other form of advertising and selling. They are of great importance as a prestige builder for the association and the industry staging them.

Foundry shows, constituting one of the major features at conventions of the American Foundrymen's Association on alternate years, have contributed immeasurably to progress in the metal castings industry. Progress reflected through these exhibits has a stimulating effect on foundrymen and the manufacturers of equipment and supplies alike, and together they profit.

During the week of April 18 to 24, 1942, in Cleveland a Foundry and Allied Industries Show will be held in a most critical period of the Nation's history. The experience of a similar period—1914 to 1918—when five foundry shows were staged, each one with increased attendance, proved that, during times of national emergency, exhibits serve a most useful purpose in furthering defense and war time production.

With the active cooperation of the Government and Ordnance Departments in staging National Defense exhibits, the members of the American Foundrymen's Association and the many firms engaged in developing equipment and supplies for the industry are offered their greatest opportunity for service in this year 1942.

C. E. Hoyt

C. E. HOYT,
Convention and Exhibits Manager,
American Foundrymen's Association

American Foundryman

CONTENTS

November, 1941

Volume 3 **Number 11**

	Page
Industry Shows, *by C. E. Hoyt*	Inside Front Cover
Plans for 1942 Convention and Exhibit at Cleveland Are Progressing	2
Safety and Welfare Program Pays Dividends	3
Southern Foundrymen Pay Tribute to William Oberhelman	5
New Members	6
"5000 in '42" Is Slogan of National Membership Committee	7
Thousands View Spectacular Foundry Exhibit at Chicago Museum	8
A. F. A. Grinding, Polishing and Buffing Equipment Sanitation Code is American Standard	9
Tin Forms Used in Molding Operation, *by Warren A. Smith*	10
New Committee Members	14
New Chapter Officers	15
Committee Pushes Study of Defect Causes and Remedies	16
Contests for Apprentices in Molding and Patternmaking Set for 1942	17
Chapter Activities	18
Abstracts of Current Foundry Literature	29
November Chapter Meeting Schedule	33

Published by the American Foundrymen's Association, Inc., 222 West Adams St., Chicago, Ill., for the purpose of presenting Association and Chapter activities. Published monthly. Subscription price $1.00 per year. Single copies, 10c.

Entered as second class matter July 22, 1938, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Plans for 1942 Convention and Exhibit at Cleveland are Progressing

PLANS are progressing for the 46th Annual Convention of the American Foundrymen's Association to be held in Cleveland, Ohio, April 18 to 24, 1942. The Northeastern Ohio Chapter will act as host and F. J. Dost, Sterling Foundry Co., Wellington, Ohio, chapter chairman, is appointing committees to cooperate in staging the event.

Because of the problems brought forth by the present national emergency and because of the large amount of defense work being done by the industry, the 1942 technical program will be of vast assistance to the membership in solving their most urgent problems. The technical program, already well along, will feature practical and research as well as management problems in the steel, malleable, non-ferrous and gray iron divisions of the industry. Many phases of defense problems affecting castings production will be discussed. General interest sessions, addressed by outstanding speakers, will feature foreman and apprentice training, cost methods, job evaluation, time study, sand research, plant and plant equipment, patternmaking, and safety and hygiene.

The ever-popular shop courses on gray iron founding and sand control, designed primarily for the shop man, will be of practical value to those attending. The annual lecture course, now a recognized part of each convention program, will complete a series of lectures begun at the 1941 convention on core room practices and theories.

In accordance with the policy of the Association to hold exhibits of foundry equipment, materials and supplies on even-numbered years, the 1942 Foundry and Allied Industries Show will be held in conjunction with the 46th Annual Convention of A.F.A. in the Cleveland Public Auditorium and Exhibition Hall. This show offers opportunities for rendering not only greater service to the industry, but to the Government as well. President Roosevelt, in a recent letter to the executive of a recent eastern exhibition, welcomed the staging of industrial exhibits when he stated, "In this connection, business institutions that are engaged in making defense goods must realize that efficient production has its tap root in the minds and hearts of the people" and also that "Wherever people congregate, the story of defense must be presented." Similar expressions have been made by Wm. S. Knudsen, Director General, Office of Production Management; E. S. Land, chairman, U. S. Maritime Commission, and H. L. Stimson, Secretary of War.

Carrying out these expressed opinions, an important and educational adjunct to the 1942 Foundry and Allied Industries Show will be an exhibit of ordnance under the direction of the Ordnance Officer - in - Charge, Cleveland Ordnance District, and officers and members of the Cleveland Post, Army Ordnance Association. In addition, other Government departments, including the Federal Committee on Apprenticeship, will arrange educational displays under the direction of the Supervisor of Exhibits, Division of Labor Standards, U. S. Department of Labor. A display of castings used in the National Defense program will be shown in connection with the ordnance exhibit.

The co-operation of Government agencies with the Association staging a Foundry and Allied Industries Show is not new. In 1918 a display of ordnance equipment by the U. S. Ordnance Department was featured. It might be pointed out also that during the national emergency created by World War No. 1, five conventions and exhibits were staged with increasing interest and attendance each year.

Surveys of conventions held during this year clearly indicate an increase in attendance and interest in shows that fill an economic need and offer service to companies engaged in new activities or faced with increased production demands. All these facts point to the 46th Annual Convention of A.F.A. and the 1942 Foundry and Allied Industries Show being a record-breaker, both from the standpoint of attendance and interest.

The Cleveland Public Auditorium, where the Association will hold its 46th Annual Convention and Foundry and Allied Industries Show.

Fig. 1—Bulletin board on Employees' Welfare Building at Oakland, Calif., plant.

Safety and Welfare Program Pays Dividends

IT IS generally recognized that increased attention to the welfare of the individual worker and to a comprehensive plant safety program gives many indirect returns, such as lower labor turnover, fewer rejects, less time off, etc. However, some plants have passed these advantages off as being intangible assets because it is difficult to place a dollar-and-cents value on them. It is possible, however, to show that such programs actually justify themselves in tangible savings which pay for and, in some instances, return a profit to the company.

An illustration of this fact is the American Manganese Steel Division of the American Brake Shoe and Foundry Company. This organization has six plants located in Chicago Heights, Ill.; Oakland, Calif.; New Castle, Del.; Los Angeles, Calif.; Denver, Colo.; and St. Louis, Mo. These plants are engaged in a common safety and welfare program based on cleanliness, good housekeeping and interest in the individual worker. It has been estimated that through the effective safety and welfare program engaged in by this division of the Brake Shoe Company, the reduction in accident severity and frequency has saved $15,000 annually in reduced compensation and insurance rates. This is more than enough to pay for actual cost of the safety program.

All plants of this division of the American Brake Shoe and Foundry Company have welfare buildings. Each is of a size and type conforming to the employment requirements of the plant. The Chicago Heights welfare building, which is typical and which is shown in the accompanying illustration, is approximately 88 ft. wide and 55 ft. deep of fireproof construction, having two floors, a main floor and an English basement. It also has a spacious, enclosed porch extending almost the entire width of the building, which also serves as a corridor and entrance to the various main floor rooms. A total of five locker rooms, four for general use and one for foremen, containing locker accommodations for approximately 450 employees, are located here. The main floor houses the locker, shower and drying rooms. All locker rooms are of cement and covered with rubber mats where necessary. Adequate benches also are provided to allow men to sit while dressing.

All lockers are set on an 8-in. high concrete curb, which houses an exhaust duct through which the foul air is drawn to the outside of the building. In the locker ventilating system, air from the locker rooms is drawn into each locker through slots in the upper part of the locker door, and passes downward through the lockers, thus airing and drying the clothing in the locker, then passing into the exhaust duct below the lockers through the perforated locker bottom.

The air thus drawn from the room through all lockers is discharged to the outside air through air ducts in the walls. Lockers have peaked tops to prevent accumulation of dust, refuse or personal belongings.

Fig. 2 (Left)—Welfare Building at Chicago Heights, Ill., plant. (Right)—Welfare Building at Denver, Colo., plant.

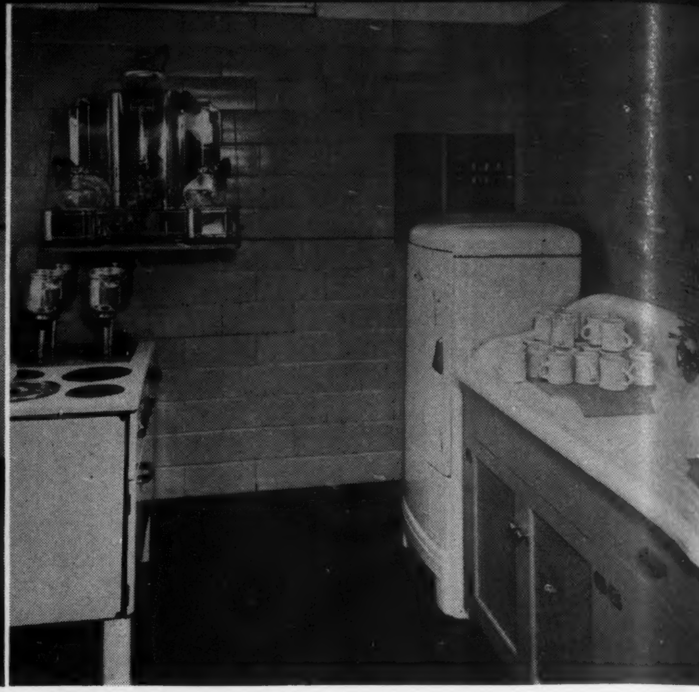


Fig. 3—(Left) Tiled shower-room at Los Angeles plant. As at the other five plants, showers, wash fountains, lockers, rest and lunch-rooms are housed in a separate building set aside for employee welfare activities. Fig. 4—(Right) Lunch-room kitchen at Denver plant. Employees are served free coffee at noon.

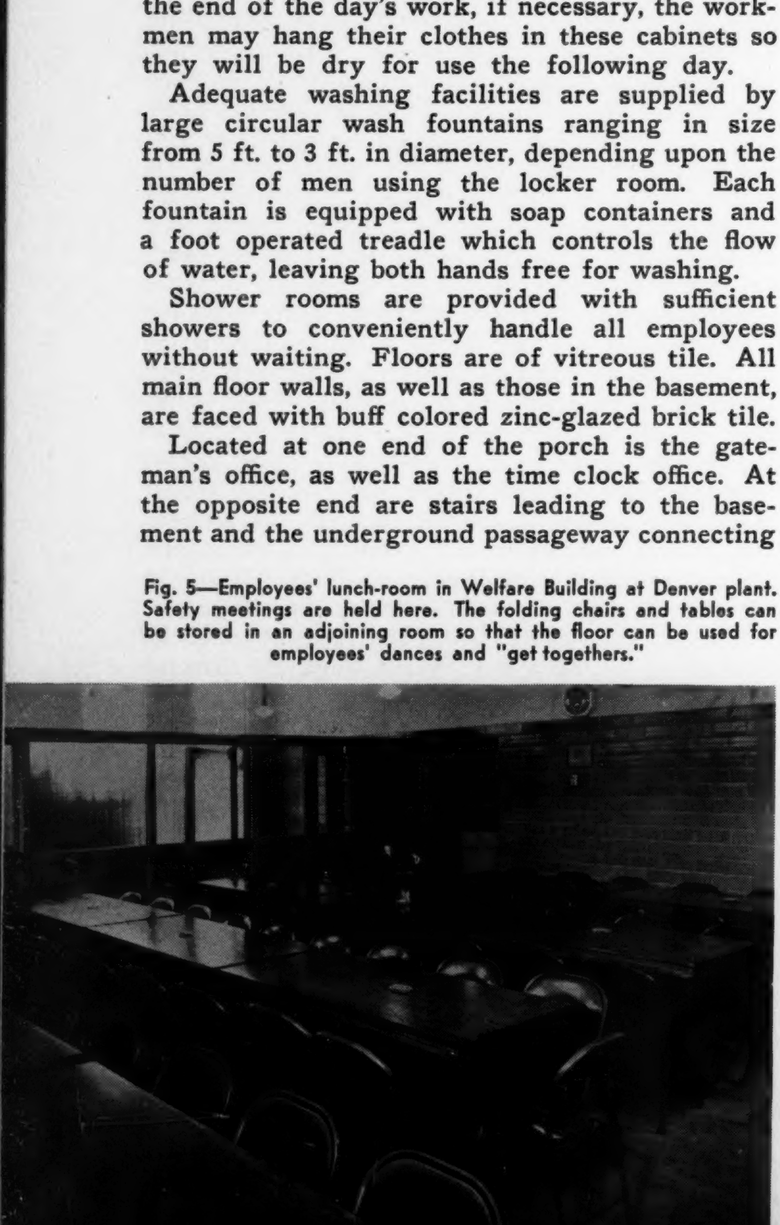
For the added convenience of those men working around the furnaces, ovens, etc., who are subject to excessive perspiration, each locker room is equipped with a gas-fired drying cabinet. At the end of the day's work, if necessary, the workmen may hang their clothes in these cabinets so they will be dry for use the following day.

Adequate washing facilities are supplied by large circular wash fountains ranging in size from 5 ft. to 3 ft. in diameter, depending upon the number of men using the locker room. Each fountain is equipped with soap containers and a foot operated treadle which controls the flow of water, leaving both hands free for washing.

Shower rooms are provided with sufficient showers to conveniently handle all employees without waiting. Floors are of vitreous tile. All main floor walls, as well as those in the basement, are faced with buff colored zinc-glazed brick tile.

Located at one end of the porch is the gateman's office, as well as the time clock office. At the opposite end are stairs leading to the basement and the underground passageway connecting the welfare building and the foundry. This underground passageway was installed as a health measure so that employees would not have to be exposed to inclement weather or become chilled when going to the shower rooms after working at hot operations.

Fig. 5—Employees' lunch-room in Welfare Building at Denver plant. Safety meetings are held here. The folding chairs and tables can be stored in an adjoining room so that the floor can be used for employees' dances and "get togethers."



In one section of the basement is located the boiler room; in another, shower and locker rooms. Next to these rooms is a sanitary and well appointed lunchroom equipped with tables and benches, in which the shop employees may eat their lunch and enjoy coffee, served free of charge, from a modern kitchen attached to the lunch room. Also located in the basement is the first aid room containing cots, medicine cabinets, heat lamps and all necessary equipment for first aid work.

Effective employee safety committees operate in each plant to review all matters pertaining to safety and safety recommendations. Membership is rotated so every man serves on a committee at one time or another. All safety suggestions are either adopted or it is explained in full why they are not practical.

One of the outstanding safety records is that of the Oakland, Calif., plant. Reports covering 20 plants and representing 5,759,000 man-hours of exposure in the same district show effectiveness of this plant's program.

According to the National Safety council, national steel foundry accident frequency is 24.13 and severity is 0.97. This compares with a frequency of 23.10 and severity of 0.71 for the American Manganese Steel Division at Oakland. A second comparison, based on loss records of all steel foundries in California, shows the American Manganese Steel losses are 27 per cent below the average for the steel foundry industry of that state. A record, totaling 641 consecutive days of operation, with close to one-half million man-hours of work without a lost-time injury was set in the Oakland plant.

Basis of the successful safety methods is an enthusiastic belief on the part of the management that safe operation is vital as is wholehearted cooperation of executives in promoting safety aims. Also important are foremen who recognize that accidents do not "happen" but are caused and so can be prevented. Determination of responsibility immediately after each accident helps establish improved procedure to prevent repetition. Participation of workmen, foremen and executives in safety committee work is another essential. Development of pride in safety achievements through safety assemblies, contests, awards and recognition by company and outside agencies also is most important. Employees are instructed as to the hazards of their occupation.

At the Chicago Heights plant, the frequency rate was reduced from 15.0 to 4.4, a substantial improvement.

Inspectors play an important part. At the New Castle, Del., plant the safety director is also the safety inspector and is assisted by two regular inspectors — the electrician and millwright. Doing maintenance work continually, these latter men are practically on inspection at all times.

At the St. Louis plant, 315 days of operation were recently completed without a lost-time accident. Here it has been found that the psychology of reading the employee's name and discussing his accident at the monthly meeting of safety representatives during plant hours has a big effect on reducing the number of accidents.

Fig. 6—Locker-room in Employees' Welfare Building at Denver plant. Note peaked roofs on lockers to avoid collection of dirt and refuse.

By recording each accident in a book, the safety director can determine where the greatest number of accidents occur and concentrate efforts on that portion of the plant. Here the inspection program includes checking all chains and cables weekly and all goggles, shoes and other safety equipment monthly.

In addition to the annual savings through reduced compensation and insurance rates, careful consideration of workers' welfare has been found to reduce labor turnover, to attract a better class of workmen, to assure complete cooperation in the company's safety and good housekeeping programs and to increase employees' satisfaction.

Southern Foundrymen Pay Tribute to William Oberhelman

MEMBERS and friends of the Birmingham District Chapter, at its sixth annual barbecue September 20, temporarily suspended all celebrations to pay tribute to William Oberhelman, widely known and universally loved and respected foundryman, who died June 28. Mr. Oberhelman had been connected with the Hill & Griffith Co. for many years and at the time of his death was vice president and southern branch manager.

L. N. Shannon, vice president, Stockham Pipe Fittings Co., Birmingham, a past president and director, American Foundrymen's Association, and one of Mr. Oberhelman's closest friends, eulogized his life and work in the foundry industry and in activities of the Association. Mr. Shannon reminded the group of several incidents in Mr. Oberhelman's life which illustrated his kindness and interest in giving advice and help to struggling foundrymen, ending with the statement that "We in the foundry industry, particularly in the South, have lost one of the best friends and most interested counselors we have ever had, and whose spirit and influence we miss and are going to continue to miss for many years to come." The entire group of 525 then bowed their heads for a minute of silent prayer in Mr. Oberhelman's memory. The picture below shows Chapter Chairman Jim Bowers addressing the members.

Neumiller Elected Caterpillar President

LOUIS B. NEUMILLER, who began his work for Caterpillar Tractor Co., Peoria, Ill., 26 years ago, has been elected president of the company, succeeding B. C. Heacock. Mr. Neumiller joined the Caterpillar Tractor Co. as a stenographer and blue print clerk and progressed through various positions.

Mr. Heacock, president since 1930, becomes chairman of the executive committee.

Birmingham Chapter pays tribute to the late William Oberhelman, Hill & Griffith Co., who died June 28.

NEW MEMBERS

As can be seen in the list below, chapter membership committees have not been letting the grass grow under their feet. Wisconsin, continuing the good example set by last year's prize winning committee, got off to a flying start by obtaining 24 new members. Second place was taken over by Chicago chapter with eight new members, and the Metropolitan chapter was third with seven. The Association extends a hearty welcome to those new members listed below and commends the various chapter membership committees for the work they are doing.

(September 19 to October 17, 1941)

Birmingham Chapter

C. J. Pruet, McWane Cast Iron Pipe Co., Birmingham, Alabama

Central Indiana Chapter

*Anderson Stove Co., Inc., Anderson, Ind. (Arthur A. Brady, President)
Paul B. LaVelle, Vice Pres., LaVelle Gray Iron Foundry Co., Anderson, Ind.
Paul S. McNamara, Secy.-Treas., McNamara Koster Fdry. Co., Indianapolis, Ind.

Central New York Chapter

Frank J. Baker, Mgr., Syracuse Foundry Co., Syracuse, New York
G. A. Pealer, Foreman, Patt. Shop, Elmira Foundry Co., Elmira, N. Y.
S. A. Stepneski, Core Room Foreman, Elmira Foundry Co., Elmira, N. Y.

Chesapeake Chapter

Martin Holmstead, Fdry. Foreman, Maryland Car Wheel Co., Baltimore, Md.
Lawrence Lowman, Cupola Foreman, Maryland Car Wheel Co., Baltimore, Md.

Chicago Chapter

John H. Eckenroad, Jr., Asst. Foreman, Crane Company, Chicago, Ill.
William L. Garner, Foreman, National Malleable & Steel Castings Co., Cicero, Ill.
Aubrey Grindle, Whiting Corp., Harvey, Ill.
Louis J. Jacobs, Research, S. Obermayer Co., Chicago, Ill.
*Michigan Avenue Foundry Co., Chicago, Ill. (Joseph M. Fabian, Pres.)
C. B. Schureman, Tech. Consultant, F. E. Schundler & Co., Inc., Joliet, Ill.
*Silverstein & Pinsof, Chicago, Ill. (Philip Pinsof, Asst. Secretary)
*Tamms Silica Co., Chicago, Ill. (Fred Knisley)

Metropolitan Chapter

Edward Cox, Asst. to Fdry. Supt., Eclipse Aviation Co., Bendix, N. J.
Edward Engelhard, Pyrometer Tech., Wright Aeronautical Corp., Paterson, N. J.
Aaron L. Gray, Supv., Eclipse Aviation Corp., Bendix, New Jersey
George W. Kurachek, Fdry. Met., Wright Aeronautical Corp., Paterson, N. J.
*Frank Roth Co., Bronx, New York, N. Y. (James C. Hartley, Chief Met.)
G. Santandrea, Asst. to Coreroom Foreman, Eclipse Aviation Corp., Bendix, N. J.
Anton Wagner, Asst. Foreman, Eclipse Aviation Corp., Bendix, N. J.

Michiana Chapter

Joseph Brajcki, Fdry. Foreman, Bendix Products Div., South Bend, Ind.
Fletcher T. Henderson, Fdry. Tech., Bendix Products Div., South Bend, Ind.
Russell D. Hoffman, Patt. Shop Asst. Foreman, Bendix Products Div., South Bend, Ind.
Arthur T. Ruppe, Asst. Supt. of Fdry., Bendix Div., Bendix Aviation Co., South Bend, Ind.
Richard H. Weissfuss, Patt. Shop Foreman, Bendix Products Div., South Bend, Ind.

Northeastern Ohio Chapter

Robert R. Hoffman, Sales Mgr., Hoffman Foundry Supply Co., Cleveland, Ohio

*Company.

Northern Illinois-Southern Wisconsin Chapter

*J. I. Case Co., Rockford, Ill. (William E. Goff, Fdry. Superintendent)
*Geo. D. Roper Corp., Rockford, Ill. (R. D. Baysinger, Fdry. Superintendent)
David O. Rumer, Brass Melting Foreman, Fairbanks, Morse & Co., Beloit, Wis.

Ontario Chapter

*Hamilton Foundry Co., Hamilton, Ont. (R. W. Cross, Manager)
E. G. Storie, Fittings Limited, Oshawa, Ont., Canada

Quad City Chapter

Ludvig Koenig, Foreman, International Harvester Co., Rock Island, Ill.
Keith Patterson, Supv., International Harvester Co., Rock Island, Ill.

St. Louis Chapter

*Koppers United Co., Blast Furnace Div., Granite City, Ill. (C. W. C. Page, Chief Chem.)
*Walsh Refractories Corp., St. Louis, Mo. (Harold Oswald, Sales Mgr.)
Frank Weir, Salesman, Harbison Walker Refractories Co., St. Louis, Mo.

Twin City Chapter

Howard M. Tomasko, Apprentice, University of Minnesota, Minneapolis, Minn.

Western Michigan Chapter

*Attwood Brass Works, Grand Rapids, Mich. (C. H. Attwood, Pres.)
Henry Conran, Attwood Brass Works, Grand Rapids, Michigan
Thos. Dysart, Attwood Brass Works, Grand Rapids, Michigan
Robert P. Stevens, Sales Engr., Chicago Retort & Fire Brick Co., Chicago, Ill.

Western New York Chapter

A. Westons, Clark Bros. Co., Inc., Olean, N. Y.

Wisconsin Chapter

Frank J. Bacun, Time Study Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
Harry J. Brodhagen, Fdry. Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
V. E. Brownell, Wisc. Repr., Walsh Refractories Corp., St. Louis, Mo.
Gustav A. Dewald, Supv. Training Em., Ampco Metals, Inc., Milwaukee, Wis.
Clifton C. Feder, Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
*Foundries Supply & Sales Co., Milwaukee, Wis. (Elroy Keller, Secy.-Treas.)
Joseph H. Grahek, Fdry. Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
Carl L. Hansen, Scale Clerk, Allis-Chalmers Mfg. Co., West Allis, Wis.
Harry J. Holst, Time Study Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
Marvin R. Kotvis, Sales Mgr., Foundries Supply & Sales Co., Milwaukee, Wis.
Charles F. Lebesch, Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
Herman Madland, Research Dept., Allis-Chalmers Mfg. Co., West Allis, Wis.
Edson J. Palmer, Iron Distributor, Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Raymond Pronozinski, Fdry. Foreman, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
George E. Rink, Research Dept., Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Clifford E. Rude, Foundry Foreman, Allis-Chalmers Mfg. Co., West Allis, Wis.
Henry Sangren, Foreman, Bucyrus Erie Co., South Milwaukee, Wis.
William J. Schmidt, Research Dept., Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Russell J. Schultze, Supv., Ampco Metals, Inc., Milwaukee, Wis.
Paul Thelen, Melting Foreman, Ampco Metals, Inc., Milwaukee, Wis.
Francis J. Walsh, Gen'l Foreman, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Robert M. Waltermire, Shop Buyer, Ampco Metals, Inc., Milwaukee, Wis.
Chester Witkowski, Foreman, Ampco Metals, Inc., Milwaukee, Wis.
*Witters Foundry Supply Co., Milwaukee, Wis. (Peter J. Weber, Chemist)

Outside of Chapter

Antonio Barella, Blesa 35, Barcelona, Spain
Charles H. Cox, Jr., Pacific States Cast Iron Pipe Co., Provo, Utah
*Mackintosh-Hemphill Co., Pittsburgh, Pa. (F. C. T. Daniels, Vice Pres.)
F. V. Martin, Cupola Foreman, Pacific States Cast Iron Pipe Co., Provo, Utah
Paul Perazelli, Teacher, Leavenworth High School, Waterbury, Conn.

"5000 in '42" Is Slogan of National Membership Committee

IN the October issue of *American Foundryman*, announcement was made of the appointment of a National Membership Committee, headed by B. D. Claffey, General Malleable Corp., Waukesha, Wis., and a Director of the Association, with E. W. Horlebein, Gibson & Kirk Co., Baltimore, as vice chairman. Membership of the committee includes not only chapter chairmen and chairmen of chapter membership committees, but also representatives from non-chapter territories. The editorial by Chairman Claffey in the October *American Foundryman* laid the ground work for the beginning of this committee's activity. The 1941-42 Membership Committee has adopted as a slogan "5,000 in '42."

Everyone likes to belong to a growing organization and members of the American Foundrymen's Association can point with pride to the job being done both within and without chapter areas toward increasing the membership of their Association. Truly, the American Foundrymen's Association is a growing organization. That this is so is indicated by the long list of new members shown on the accompanying page.

This list of new members is a tribute to the good work not only of the National Membership Committee but also of the work of Chapter Membership Committees and interested individuals. Scanning the list, we see that from September 19 to October 17, 1941, the Wisconsin chapter leads the parade with 24 new members. This is a continuation of the sustained membership drive put on by that chapter last year and which resulted in their capturing the coveted bronze bell awarded first prize in the 1940-41 membership drive. Second in standing this month is the Chicago chapter with eight new members. Last year, the Chicago chapter was nosed out of third place in the final standings. In third place is the Metropolitan chapter with seven new members. May we take this opportunity to wish them even greater success in the months to come. While not mentioned specifically as leaders of this month's effort, Central New York, Birmingham, Michiana, Northern Illinois-Southern Wisconsin, Quad City, St. Louis, Western Michigan, Western New York, Twin City, Ontario and Chesapeake chapters have listed new members this month, which indicates that their membership committees are on the job.

While the recently appointed National Membership Committee has not as yet definitely settled on its program, it probably will conduct a membership competition similar to that held last year. Similarly to the 1940-41 membership competition, bronze bells will be offered as first, second and third prizes to the chapters placing respectively in the contest. The committee is working on a method of evaluating the membership effort in such a way that each chapter will have an equal opportunity for the prizes. It has been reported unofficially that the system will be based on the number of membership possibilities within a given chapter area. By this method, a quota will be set for each chapter and the proposed system will eliminate the difficulties which occurred in last year's program where the largest or newest chapters had the best opportunity for winning prizes.

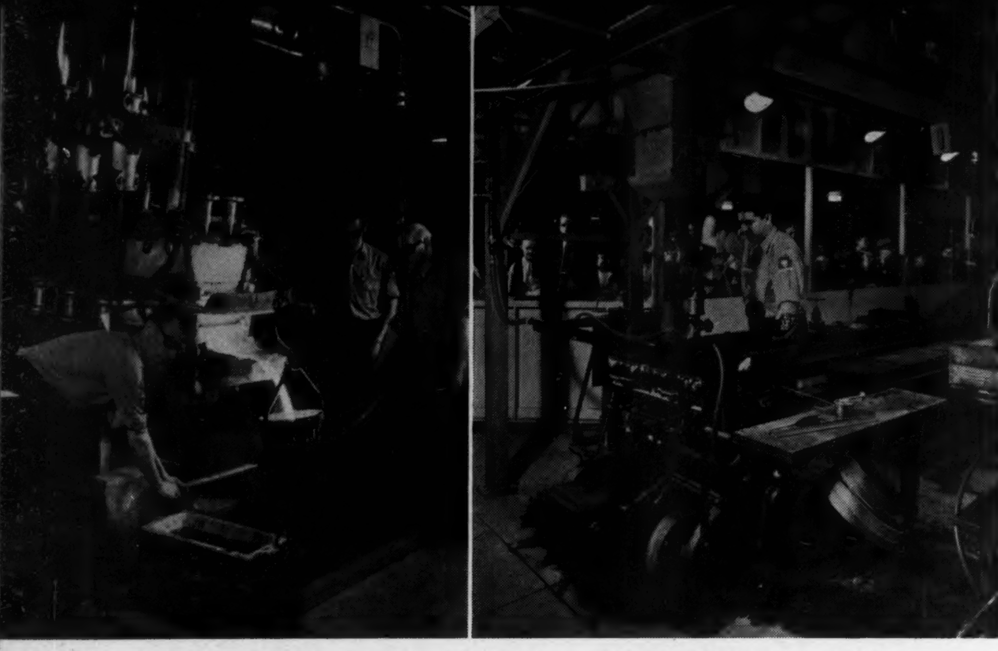
In the above statement, we are just giving you a little advance "dope" which, we emphasize, is still unofficial.

"Start Sooner" Is Theme Opening Safety Drive

THE nationwide Emergency Safety Campaign, proclaimed by the President, now is in full sway. This campaign, which began on October 6, is designed to enlist each citizen in a campaign to prevent the wastage of human and material resources of the nation through accidents.

Industrial accident deaths are up 7 per cent over last year, traffic deaths increased 17 per cent, and all accidental deaths 3 per cent. Probable accidental deaths for 1941 will be approximately 100,000, the equivalent of several weeks' casualty lists in the present war.

Over 125 national organizations are co-operating in this safety drive. The opening theme for the campaign is "Start Sooner," meaning if you must travel, start sooner from home or office so that you can take your time. The drive is not limited to traffic accidents but covers industrial, highway, home and farm casualties. Few people realize the huge toll taken from the citizenry by accidents in the home.



The foundry exhibit at the Museum of Science and Industry, Chicago, attracts thousands of spectators. Left—Museum employees tap metal from an electric furnace. Right—Interested bystanders watch man operate a molding machine.

Thousands View Spectacular Foundry Exhibit at Chicago Museum

ON Nov. 9, 1939, the completion and dedication of "a foundry operating exhibit" at the Museum of Science and Industry, Jackson Park, Chicago, was announced. The dedication was held at a special session of a regional conference, sponsored by the Chicago chapter in co-operation with the Museum, and was an impressive ceremony.

In the previously mentioned article it was stated that the foundry exhibit "serves both as an educational exhibition and as an effort on behalf of the industry to improve its relations with the public." The illustration on the front cover is ample evidence that the foundry exhibit is fulfilling its purpose. Note the interest with which visitors are viewing the pouring operation through the glass enclosure which surrounds the actual operations. Neither are they of one age. Young and old alike gaze with awe on the molten metal so familiar to all foundrymen, yet one which is ever interesting and spectacular. The two illustrations accompanying this article show the molten metal being tapped from the electric furnace and the making of the mold. In the latter illustration, the same interest is evidenced by the audience in the background as was shown in the cover picture.

For those who are not familiar with the Museum of Science and Industry, it was founded by Julius Rosenwald and occupies the reconstructed Fine Arts Building of the World's Columbian Exposition of 1893. The building contains approximately 14 acres of floor space, 11 of which are available for exhibits and more than eight of which are now in use. Most of the exhibits are in motion and many in production.

Since admission to the Museum is free at all times, a fair cross-section of interested American people comes to the Museum daily. Preliminary figures show attendance for the current year will exceed one million. Over 16,000 visited the Museum on Labor Day alone. About one-half the attendance comes from Chicago, one-sixth from other points in Illinois, and the remainder from all states of the Union and Canada. About 22 per cent of the attendance is high school and university students. The Museum handled over 70,000 students during the past academic year. It is interesting to note that the largest portion of the attendance is adult and that students lead in the occupational breakdown followed by housewives, clerks, no occupation, salesmen, accountants, machinists, stenographers, chemists, draftsmen and printers in the order named.

The foundry exhibit is open to all these visitors, performing its function of publicizing to the general public the contributions which the foundry industry is making to our present great American civilization.

The Association takes just pride in the work of the Chicago chapter in sponsoring this foundry exhibit. The results of this co-operation show what chapters can do.

Important!

Papers for 1942 Convention

EACH year some members submit papers which come in too late for review for acceptance at the annual convention. To prevent such disappointment in connection with the 1942 convention, members are urged to write at once to Association headquarters, 222 West Adams St., Chicago, Ill., giving information as to papers which they wish to submit to the program committee. The Association is especially anxious to receive papers on practical subjects for the ever-popular shop course sessions. Numerous subjects dealing with conditions in nonferrous, malleable, cast iron and steel foundries in relation to substitutions in melting materials due to shortages and ways and means to circumvent other materials shortages also, should afford the basis for some interesting practical papers. Members also are invited to suggest topics which they believe should be covered by papers for the various sessions, listing names of those whom they believe should be invited to prepare these manuscripts.

A.F.A. Grinding, Polishing and Buffing Equipment Sanitation Code is American Standard

THE September, 1941, issue of *Industrial Standardization,* the monthly publication of the American Standards Association, presented an extensive review of the work of the A.F.A. Committee on Safety and Hygiene, discussing in particular the Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation. The American Standards Association offered the A.F.A. Committee cooperation in reviewing this code for possible adoption as an American standard under the procedure of the A.S.A. Subsequently favorable action by the A.S.A. has been reported.

In its report on the adoption of this new American standard, *Industrial Standardization* said:

"In 1935, the Board of Directors of the American Foundrymen's Association created a new staff section known as the Safety and Hygiene Section of the A.F.A. This section was established for the purpose of compiling uniform, practical information on safety and health for the use of the foundry industry. In listing the various fields of activity for the new section, the Board of Directors outlined the following objectives:

"(a) 'To assist in the standardization of dust-eliminating equipment and improvement of shop operation conditions in the foundry industry', and

"(b) 'To promote standards for dust elimination and control equipment in cooperation with agencies of manufacturers of such equipment.'

"To carry out this program an Industrial Hygiene Codes Committee was organized which, operating through the Safety and Hygiene Section of the A.F.A., instituted work on a number of codes in accordance with the objectives set up by the Board of Directors.

"One of these codes, completed by the committee and approved by the Board of Directors of the A.F.A. in 1936, was the Tentative Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation.

"At about the time this work was started, the A.S.A. committee on the Safety Code for Exhaust System (Z9) decided to prepare standards covering grinding, buffing and polishing for use in all industries where such equipment was in operation. Representatives of the American Foundrymen's Association on the A.S.A. committee called attention to the fact that such a code was already under development, and, in order to avoid duplication of effort, suggested to the sectional committee that activity on this subject be deferred pending completion of the A.F.A. code. The A.S.A. committee agreed to this suggestion with the understanding that the code being prepared by the American Foundrymen's Association would be submitted for approval as an American Standard.

Receives Wide Circulation

"Following completion of the document, the A.F.A. not only distributed copies to the members of the foundry industry but also widely circulated the code among interested organizations and individuals throughout the United States. It also was brought to the attention of the regulatory bodies of several states, which adopted it as the basis of their own requirements.

"The favorable reception given the code by these organizations caused the American Foundrymen's Association to submit it to the American Standards Association for approval as an American Standard. This action was recently completed. The American Foundrymen's Association has thus made a contribution to the group of standards generally available for the use of American industry.

"It had been the intention of the American Foundrymen's Association, when submitting its code to the A.S.A., that the scope be made applicable to all industries using grinding, buffing and polishing equipment. Consideration of the code by the members of the exhaust systems committee, and later by the Safety Code Correlating Committee, indicated the desirability of limiting the scope to the grinding, buffing and polishing of ferrous and non-ferrous metals. The committees considered the fact that the type of equipment covered by the code is being used today to grind, polish and buff various kinds of substances besides metals, about which little is known as to possible toxic properties. It was, therefore, believed unwise to indicate that the engineering principles set forth in the standard were adequate for all types of materials."

The greatest credit for the work of the A.F.A. Industrial Hygiene Codes Committee goes to James R. Allan, International Harvester Co., Chicago, *chairman;* E. O. Jones, formerly director, Safety and Hygiene section, American Foundrymen's Association, and now connected with the Belle City Malleable Iron Co., Racine, Wis., and to the several committee members who devoted much time and effort to the formulation of this and several other codes. The complete list of A.F.A. codes includes:

Tentative Code of Recommended Practices for Testing and Measuring Air Flow in Exhaust Systems.

Tentative Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation (now approved as American Standard).

Tentative Recommended Good Practice Code and Handbook on Fundamentals of Design, Construction, Operation and Maintenance of Exhaust Systems.

Code of Recommended Good Practices for Metal Cleaning Sanitation.

Code of Recommended Good Safety Practices for the Protection of Workers in the Foundry.

Tin Forms Used in Molding Operations

By Warren A. Smith,* Geneva, Ill.

Herein the author presents interesting data on the use of tin forms in molding operations and what results can be expected. Tin forms are used to form parts of a casting that, if made solid on the pattern, would not draw; another purpose is to secure greater accuracy, smoothness of surface or finer detail; and also as a protection on slender cores or on cores having sharp corners. The illustrations help to show how and why tin forms are used on such articles as conveyor chains and grate bars. The participants in the discussion, at the end of the paper, relate their experiences with tin forms.

In this paper, the author will discuss the use of tin forms in molding operations; what they are, how they are used, and what results can be expected.

Tin forms are used for several purposes. One is to form parts of a casting that, if made solid on the pattern, would not draw. A box of the required shape is made of tin plate and hung on the pattern in such a way that it will not move when the sand is being rammed and so that the pattern can be drawn away from it, leaving it in the mold to fill with metal. Another purpose is to secure greater accuracy, smoothness of surface, or finer detail than can be obtained from sand at some important part of the casting. The square holes in valve handles are an example. Tin forms also are used as a protection on slender cores or on cores having sharp corners.

These forms ordinarily are made from tin plate, that is, sheet steel coated with a thin layer of tin. The tin coating helps to keep the forms clean and free from rust. When the hot metal comes in contact with the forms in the mold, they partially fuse with the metal. As they are in contact with the sand on one side, they do not melt entirely, but for all practical purposes, they become a part of the casting.

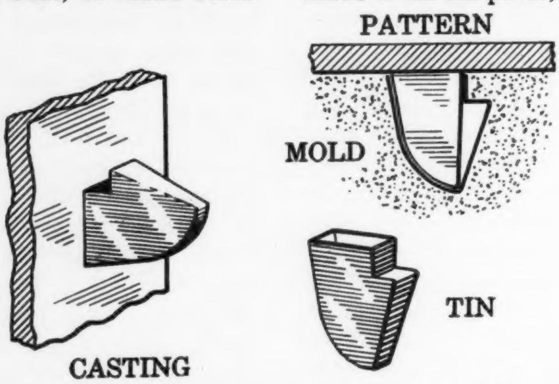


Fig. 1—Tin Form for Furnace Door Catch and Its Application.

Forming Casting Part That Will Not Draw

The simplest tins are those used for forming a part of the casting that would not draw from the sand. A furnace door catch is a good example (Fig. 1). A core should be used to form the notch, but it would have to be nailed to hold it down and it would leave an unsightly mark on the casting. Tin forms, the shape of the required catch, are dropped on a pilot on the pattern. The molder tucks the sand a little to be sure it is firm in the notch and then rams the mold in the regular manner. When the pattern is drawn, the tin stays in the sand and fills with metal. If you will look at a catch on a furnace that has been in use for a long time, you will probably find the tin worn through, but the author has never seen one where the tin has become ragged. Catches also are formed with a tin form which covers only part of the lug (Fig. 2). These are a

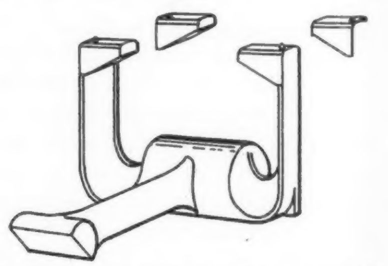
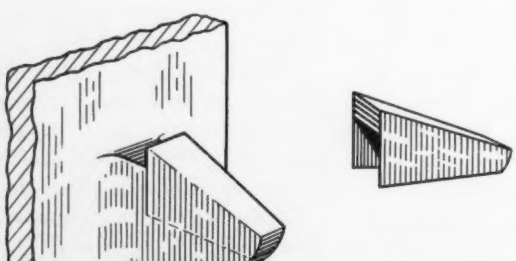


Fig. 4—Forms for Use in Conveying Chain Casting.

*Smith-Richardson Mfg. Co.

NOTE: This paper was presented at a session on Patternmaking at the 1941 A.F.A. Annual Convention, New York City, May 14, 1941.



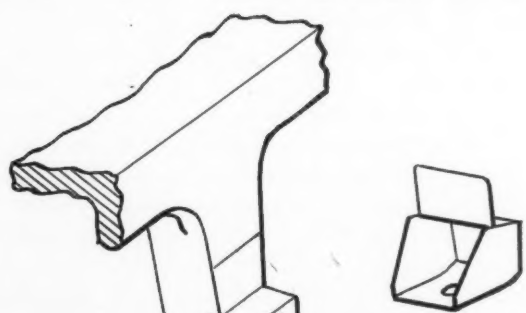
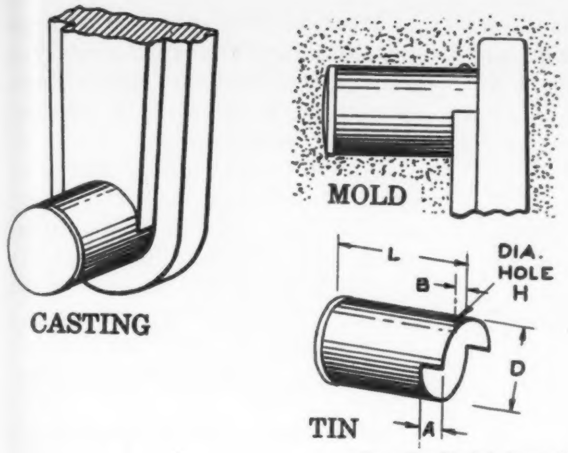


Fig. 2—(Left) Catch in Which Tin Form Covers Part of Lug Only. Fig. 3—(Right) Foot Tin Forms.



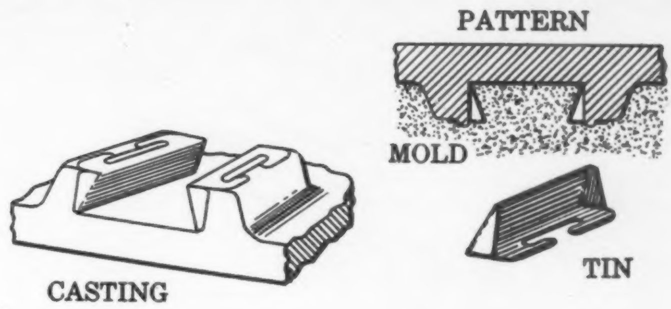


Fig. 5—(Left) Round Lug Tins. Fig. 6—(Right) Dove Tail Tins.

little cheaper and seem to work just as well.

Foot Tins

Foot tins (Fig. 3) are used almost the same as catches, except that in addition to fitting the

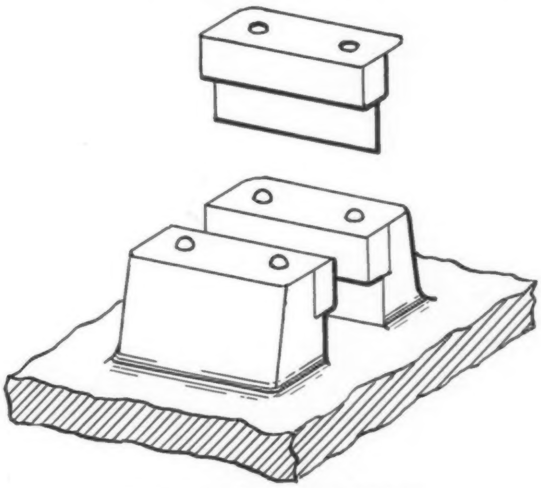


Fig. 7—Box-Type Dove Tail Tins.

pattern, they drop over a pin to hold them in place while the sand is being rammed. They are made for feet of several shapes and sizes.

Conveyor Chain

The conveyor chain link (Fig. 4) is a malleable casting. The links hook together to form a conveyor chain and, on the return, drag on the end of the prongs. To increase the area and give greater wear, extensions are cast on the prongs by means of the tin forms shown.

Grate Bars

Some grate bars of the rocking type are cast with arms which extend down into the ash pit and are connected by a bar so that several grates can be rocked in unison. The lugs on these arms, which engage the holes in the bar, often are made with round lug tins (Fig. 5). These tins are hung on the pattern before the flask is rammed, being held in place by a pin. They are sometimes pierced with two holes near the outer end so that a small core can be put through to form a hole for a cotter pin.

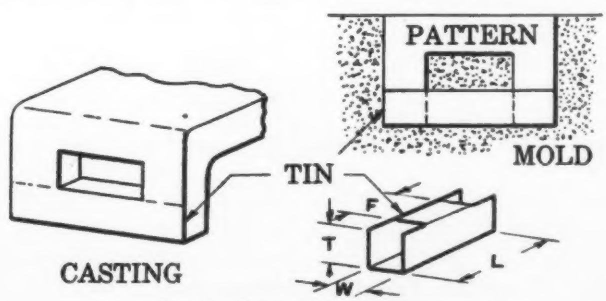


Fig. 8—Square Slot Tin Forms.

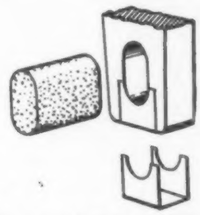


Fig. 9—Half-Hood Tins.

Dove Tail Tins

Dove tails (Fig. 6) were one of the first tins to be used. They are used in pairs to cast dovetailed recesses for a mating part to slip into, such as stove and

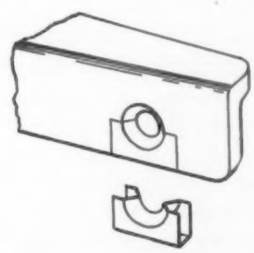


Fig. 10—Tins for Counter-Sunk Holes.

bath tub legs. Figure 6 shows the tin, how it lays in the mold, and the finished casting. Box

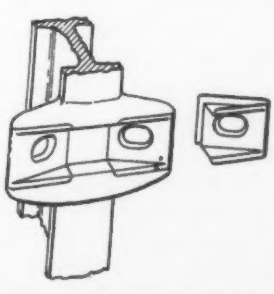


Fig. 11—Special Tin Forms for Baseball Park Seat Castings.

dove tails (Fig. 7) work in an exactly similar way to form a T-slot.

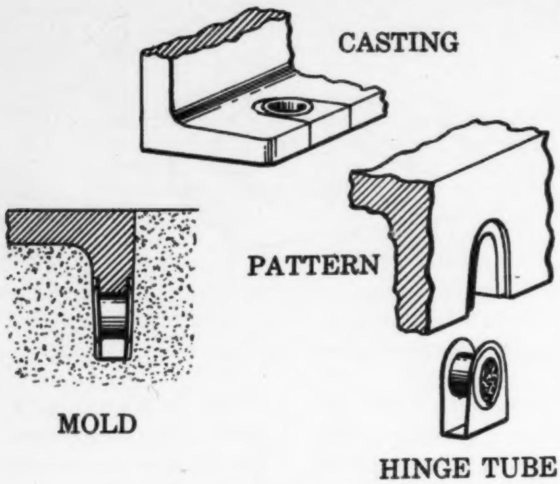


Fig. 12—Hinge Tube Tin Form.

Square Slot Tins

So far, the tins that we have discussed, have filled from an open side. Now we will discuss tins that bridge across a gap and fill from both ends. The square slot tins are typical of this type (Fig. 8). The pattern is made with a gap in it. The tin is dropped on, bridging across this gap. The sand usually has to be given a little squeeze with the finger to be sure it is firm in the opening. The pattern is drawn and the metal fills the tin from both ends.

These tins work pretty well in a light section of metal, but in heavier metal, the green sand, being entirely surrounded by hot metal, does not hold up so well. In a case of this kind, a core can be used to form the hole, covered by what we term a "half hood" (Fig. 9). The pattern is made with a gap as before. The core is laid in place and the half hood covers the open end of the gap. The core can be square, round, oval or any shape as long as the half hood is made to fit it. This method eliminates the need of stop-offs and, as the core extends out on both sides, it is sure to cut through and give a good clean hole.

The square slot tin idea is carried out in the counter-sunk hole tins (Fig. 10) which are used for coring holes for wood screws in light castings. The pattern forms one-half of the hole and the tin the other half.

Special Tin Forms

A more elaborate tin, and one which serves two purposes, is the tin used on the frames of seats used in baseball parks (Fig. 11). These are the frames used between the seats. The backs are formed by curved wooden slats bolted from one frame to the next. The tins form the bolt holes and also a recess for the

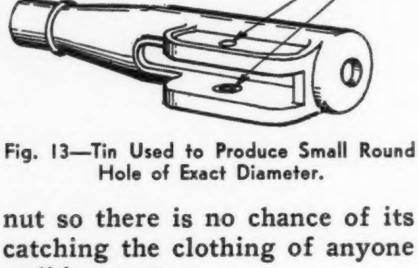


Fig. 13—Tin Used to Produce Small Round Hole of Exact Diameter.

nut so there is no chance of its catching the clothing of anyone walking past.

Hinge Tube Forms

Hinge tubes (Fig. 12) are probably the most commonly used tins. They consist of a tin tube and hood assembled and held by heading or swaging out the ends of the tube. The tube is filled with a core sand mixture and dried, similarly to a regular foundry core. A notch is provided in the pattern at the proper location, into which the hinge tube fits freely so that, after the mold is rammed, the pattern can be drawn away readily leaving the tube in the mold.

The holes secured by means of hinge tubes are smooth, round and accurate within a few thousandths of an inch for size. As the location is determined by the pattern, they always come in the same relative position, which makes the castings interchangeable.

The fact that a drawn tin shell can be used to produce a smooth round hole of exact diameter through its entire length is made use of in the casting shown in Fig. 13. The inside of the casting is cored and two of the tins shown are rammed up on the core.

Additional Uses for Tin Forms

Shells with a screw thread rolled on them, are used quite extensively for casting threaded holes for grease fittings (Fig. 14). They are particularly useful in this respect in hard iron castings which are frequently used as bearings in agricultural machinery. Shells are made for various sizes of pipe and U. S. standard thread and also for special threads. In some cases, they can be used in green sand as shown, but experience has shown that uniform and better results are obtained if the forms are filled with a fine core sand mixture and dried (Fig. 15). Of course, a rolled thread is not perfect and these shells cannot be depended on for a steam or water tight joint.

A tin is used as a protection of the sand filling in babbitt anchors (Fig. 16) and also forms

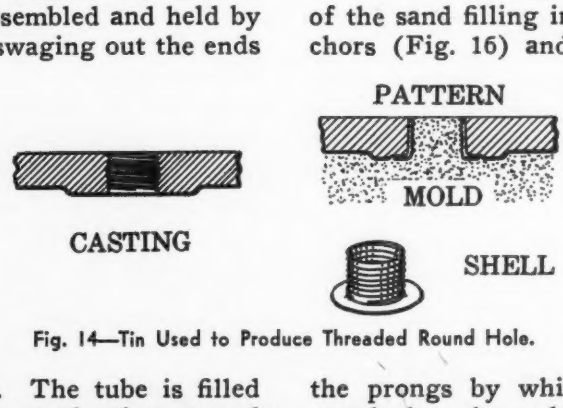


Fig. 14—Tin Used to Produce Threaded Round Hole.

the prongs by which they are attached to the mold. These are used to core the anchoring holes for babbitt metal where it is used in bearings. The tin form pre-

vents breakage of the cores and they can be handled and stored conveniently until required for use. The tin covering protects the core from the direct action of the metal so the sand cleans from the casting very readily.

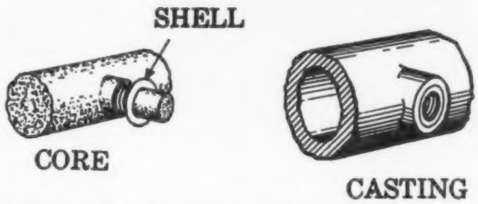


Fig. 15—Shell Tin Filled on Core to Produce Threads in Pipe Casting.

Tin tubes are used sometimes around a core to strengthen and protect it. This gives an accurate, round, straight hole which is smoother than can be obtained with a sand core.

Pattern Precautions

It is desirable to make patterns so standard tins can be used if it is at all possible to do so. This is particularly true of hinge tubes, which are largely made in automatic machines so that tooling up for a special size is an expensive operation.

Ordinarily, a production of at least several thousand castings is required to justify the expense of a special tin, but where the quantity warrants their use, tin forms often are an economical investment.

DISCUSSION

*Presiding: **Vaughan Reid**,* City Pattern Works, Detroit, Mich.

Member: I would like to ask a question on that 3/8-in. core with the tin around it. Did you cast it vertically or horizontally?

Mr. Smith: Vertically.

Chairman Reid: Tin costs so much that you can not afford to make thousands of forms out of tin. Therefore, you have to use metal with the smallest amount of tin on it. There are only two ways to get molten metal to stick to another metal and that is by having the surface of that metal perfectly free, even from the sweat of your own hand.

In our foundry we cast a lot of steel and copper tubes into copper and aluminum castings. We sand blast those tubes and the molder must touch them with pliers from that point on, because the minute you put the perspiration of your finger on that tube you will get a kick of the metal. The tin has no other value than to keep the metal from kicking.

Member: I would be interested in knowing just to what tolerance those shells are held.

Mr. Smith: The tins are held to within about plus or minus 2.5 thousandths.

Chairman Reid: That would be maximum?

Mr. Smith: Yes; however, they do shrink somewhat. You get the same shrinkage there that you would get in a casting.

Member: Then, I imagine there would be quite a bit of wear?

Mr. Smith: Yes. However, we think they wear well. There is one thing about drawn shells. They cannot be made very long. Tin plate can only be drawn through about two operations without annealing. As soon as you anneal it, the tin is gone.

Member: How long a hole would two drawing operations give?

Mr. Smith: About equal to the diameter. It is pretty hard to get it equal to the diameter, but you might be able to do it. However, the length is less than the diameter on the drawn shell.

You were speaking about the tin on this material. We have usually used what they call prime tin plate or something of that kind. It is coated with about one pound of tin to the box, that is, 32,000 sq. in. It is not a very thick coating of tin, but tin is getting scarce and lately we have had to use some electroplated tin plate.

Chairman Reid: It does the job as far as keeping the molten metal from kicking away from the job, and that is the only purpose of it.

E. J. Brady[1]*:* Our company uses thousands of tin forms in all classes of work, on stove work, particularly. We also have used them extensively on specialized jobs. I have in mind many more jobs in the future where we will use them. They work out very well. There is one little difficulty you may experience, and that is the iron used must be of such temperature to make a good weld.

If your iron is on the cold side you are likely to have misruns because the tins do have a tendency to chill the iron at that particular point and what may appear as a lug on the casting is nothing but a hollow shell. The use of cold iron must be watched and avoided. Other than that, we experience no trouble. The users of the castings containing tins are very well satisfied.

They replace, in many cases, a machined hole, and although the shell, if not welded properly to the iron is likely to peel off, in most cases it remains there and forms a very good hole or slide, as the case may be.

This is the first time I have seen the babbitt anchors used, but our foundry has used the tack core where we ram up a tack or a nail in a little box and stick those in the sand.

If any of you gentlemen have problems where you want to cast a lug or overhanging lip on a casting and do not wish to resort to a core or a loose piece or drawback, you will find these tins very useful.

F. C. Cech[2]*:* I would like to ask a question in connection with these chaplets: How much clearance do you have to put on the lugs that are

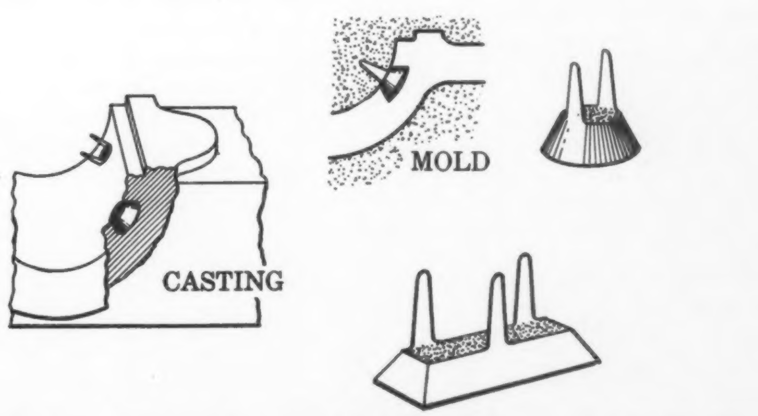


Fig. 16—Tin Used as a Protection of the Sand Filling in Babbitt Anchors. The Tin Also Forms the Prongs by Which They Are Anchored to the Mold.

[1]Chief Engineer, Western Foundry Co., Chicago, Ill.
[2]Instructor in Patternmaking, Cleveland Trade School, Cleveland, Ohio.

used on the patterns to locate these chaplets?

Mr. Brady: The amount of clearance is just a matter of having the tin slide easily in the pattern.

Mr. Cech: A slip fit?

Mr. Brady: Yes; it is the same problem you have with a ramp core. It must be an easy fit so the surrounding surface sand has sufficient hold on the tin to raise it out of the cavity and so that it will stick in the sand as you raise the mold.

Mr. Smith: We have to watch making the tins so that the shape is not subject to collapse. That is, if the tin is of such shape and form that, when the sand is rammed it hugs the pattern, it is liable to stick and we have to watch that in providing for bracing of the tin so that it will not hug the pattern.

Chairman Reid: If you make your pattern to fit one of those tins, the same as you would a loose piece on the pattern, with a nice slide to it, you will not have any trouble.

Mr. Brady: We usually supply the patternmaker samples of the particular size number to use and he makes the cavity to fit the tin.

Mr. Smith: There is just one thing more; about hinge tubes especially. There are some two hundred sizes of hinge tubes made. The tools and dies for a size of hinge tube are very expensive. The tubes must be made on automatic machines for high speed production.

It is much better for the designer and patternmaker to use something that is already in production than to send in and want something special. So often somebody wants a hinge tube just like a No. 81, for example, except that the tube should be 1/32-in. larger. They might just as well say that they want it new entirely. It means a change in the dies all the way through to make that special size tube.

A list of hinge tubes is available. All the makers of hinge tubes would be glad to send you samples and help the patternmaker pick out what he wants. Try and use the standards if it is possible to do so, because you get into difficulties on special tin forms.

Book Reviews

Metallic Abrasives Bibliography

Under the title *"Bibliography of Blast Cleaning with Metallic Abrasives,"* the Carnegie library of Pittsburgh has issued a compilation by Ralph Hopp, technology department of the library, as a reprint from *"Heat Treating and Forging,"* June-July, 1941. The reprint of 25 pages is confined to listing articles pertaining to blast cleaning with metallic abrasives, including references to material on the subject issued from the time of the invention of the sand blast by Tilghman in 1870 to April, 1940. This bibliography will be found of great value to any one of the foundry industry who wishes to make a search of the literature, as the foundry publications, both U. S. and foreign, are well covered.

Blueprint Reading

Blueprint Reading for the Machine Trades, by Russel W. Ihne and Walter E. Streeter; published by American Technical Society; paper cover with spiral binding; containing 41 blueprints and 138 pages. The instructions on a blueprint cover not only the form and size of an object, but also the kind of material of which it is to be made, the number of pieces desired and the finish of its surface. The first section of this book has been designed by the authors to teach all the basic information necessary to interpret a print. It covers the alphabet of lines, the methods of projection, relationship of views, and an understanding of dimensions. This is presented with a variety of different types of problems in order to bring out the use of different lines. A glossary of shop terms presented at the beginning of this course on blueprint reading gives rather important information, as these various terms appear on drawings and an understanding of their meaning is essential to a proper understanding of the drawings.

Problems in shop arithmetic are introduced and reviewed as the manipulation of numbers, fractions and decimals and their application to the checking of dimensions is important. The prints used to illustrate the principles of projection, or standards of drawing practice, have been taken from industry.

This book would make a worthy text for many machine trade apprentice courses or for defense training courses being organized and dealing chiefly with machine trades. The material presented herein was in great part developed and used in New Castle, Ind., city schools for the past few years with great success. This book also is a valuable addition to any industrial library.

New Committee Members

Non-Ferrous Division — Program and Papers Committee.

A. T. Ruppe, Asst. Supt. of Fdries., Bendix Products Div., Bendix Aviation Corp., South Bend, Ind.

Foundry Sand Research Committee—Subcommittee on Sintering Test.

W. Lee Roueche, Works Mgr., McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham, Ala.

Gray Iron Division—Handbook Revision Committee.

W. Leighton Collins, Asst. Prof., Theoretical and Applied Mechanics, University of Illinois, Urbana, Illinois.

Gray Iron Division — Alloy Cast Irons Committee—Subcommittee on Specific Applications.

H. S. Austin, Fdry. Met., Buick Motor Co., 3507 Sunset Drive, Flint, Mich.

Gray Iron Division — Cupola Research Committee — Subcommittee on Refractories.

Harry Foster, Fdry. Supt., Mueller Furnace Co., Milwaukee, Wis.

John Lowe, Battelle Memorial Institute, 505 King Ave., Columbus, Ohio.

R. S. Moore, Harbison-Walker Refractories Co., Farmers Bank Bldg., Pittsburgh, Pa.

Patternmaking Division — Advisory Committee.

E. J. Brady, Chief Engr., Western Foundry Co., 3634 S. Kedzie Ave., Chicago, Ill.

L. M. Sherwin, Fdry. & Patt. Shop Supt., Brown & Sharpe Mfg. Co., Providence, R. I.

NEW CHAPTER OFFICERS

G. F. Sondraker
Chamberlain Co.,
Los Angeles, Calif.
Treasurer
Southern California Chapter

R. F. Jordan
Sterling Wheelbarrow Co.,
Milwaukee, Wis.
Treasurer
Wisconsin Chapter

L. A. Gosiger
S. Obermayer Co.
Cincinnati, Ohio
Treasurer
Cincinnati District Chapter

T. D. Parker
Climax Molybdenum Co.,
New York, N. Y.
Treasurer
Metropolitan Chapter

C. M. Hardy
Hougland & Hardy Inc.,
Evansville, Ind.
Director
Central Indiana Chapter

V. L. Whitehead, Jr.
Whitehead Bros. Co.,
Buffalo, N. Y.
Treasurer
Western New York Chapter

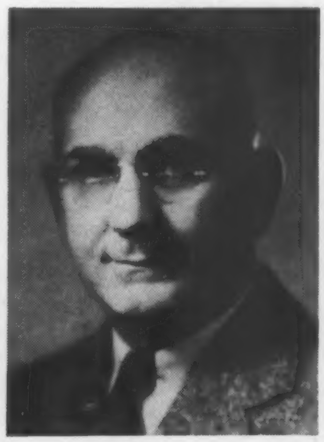
J. P. Lentz
International Harvester Co.,
Indianapolis, Ind.
Treasurer
Central Indiana Chapter

C. C. Kawin
Chas. C. Kawin Co.,
Chicago, Ill.
Treasurer
Chicago Chapter

J. W. Nichols
Ingersoll Rand Co.,
Cincinnati, Ohio
Director
Cincinnati District Chapter

Webb Kammerer
Midvale Mining & Mfg. Co.,
St. Louis, Mo.
Director
St. Louis District Chapter

Max Amos
Standard Automotive Parts Co.,
Muskegon, Mich.
Secretary-Treasurer
Western Michigan Chapter



J. F. Lammering
Hammond Brass Co.,
Hammond, Ind.
Director
Chicago Chapter

Committee Pushes Study of Defect Causes and Remedies

ONE technical committee of the Association making an annual record is the Gray Iron Division Committee on Analysis of Casting Defects. Under the chairmanship of W. A. Hambley, Allis-Chalmers Mfg. Co., Milwaukee, the committee last year initiated a schedule of monthly meetings, devoting one Saturday each month to an intensive study of the causes and remedies for all types of defects.

The personnel of the committee, in addition to Chairman Hambley, is: *Vice Chairman*, E. J. Carmody, C. C. Kawin Co., Chicago; *Secretary*, F. W. Hintze, Illinois Clay Products Co., Chicago; A. J. Busch, C. C. Kawin Co., Chicago; L. E. Everett, Kaukauna Machine Corp., Kaukauna, Wis.; R. K. Glass, Republic Steel Corp., Buffalo, N. Y.; A. S. Klopf, Hansell-Elcock Co., Chicago; John L. Lowe, Battelle Memorial Institute, Columbus, Ohio; W. B. McFerrin, Cadillac Motor Car Co., Div. of General Motors Corp., Detroit; C. H. Morken, Carondelet Foundry Co., St. Louis; C. V. Nass, Fairbanks Morse & Co., Beloit, Wis.; A. S. Nichols, Illinois Clay Products Co., Chicago; F. L. Overstreet, Illinois Clay Products Co., Chicago; W. G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J.; F. L. Weaver, Great Lakes Foundry Sand Co., Detroit; W. C. Wine, Sibley Machine & Foundry Corp., South Bend, Ind.; and Charles Zahn, Vilter Mfg. Co., Milwaukee.

The committee set as its first task the preparation of a comprehensive list of causes of defects. The list is reproduced here. Its second task, one which is being followed out now, is examining each defect and listing possible causes. The committee is collecting information and photographs and plans later to present as complete a report as possible, which can be placed in the hands of foundrymen who are responsible for analyzing defects produced in their shops.

List of Castings Defects as Accepted by Members of Committee on Analysis of Castings Defects

1. Blows, Gas Holes, Pin Holes, Blisters
2. Scabs, Buckles, Rattails, Pull Down, Blacking Scabs
3. Cuts and Washes due to Gas and Metal Erosion
4. Inclusions
   a. Sand
   b. Slag
   c. Others (Foreign Materials)
5. Crushes
6. Swells, Strains, Fins, Sags
7. Drops
8. Stickers and Rats
9. Shifts
   a. Cope
   b. Cheek
   c. Drag
   d. Core
   e. Pattern
10. Ramoff, Ramaway
11. Penetration
    a. Mass Penetration
    b. Expansion and Contraction of Sand (Cat Whiskers, Nigger Wool, etc.)
12. Fusion
13. Core Raise
14. Cracked Castings
    a. Mold
    b. Core
    c. Design
    d. Contraction
    e. Handling
15. Shot Iron and Cold Shots
16. Hard Spots, Hard Areas, Mass Hardness
17. Open Grain Structure.
18. Shrinks
19. Warpage
20. Segregation
21. Gassy Metal (so-called Oxidation)
22. Runouts (breakouts)
23. Misruns and Cold Shuts
24. Scars, Seams, and Plates
25. Off Specification
26. Inverse (Internal) Chill
27. Broken Castings
28. No Cores, Wrong Core, Core Set Wrong
29. Poured Short
30. Rough Surfaces
31. Not True to Pattern
32. Clamp Off
33. Porosity
34. Combination Blow and Shrink
35. Chill Defects as regards Chilled Castings
    a. Too high
    b. Too low
36. Bleeders

In its study of the causes of defects, the committee has listed the following as possible contributing factors:

A. Design
B. Pattern Flask Equipment and Rigging
C. Sand
D. Cores
E. Molding Practice, Gating and Risering
F. Iron Composition
G. Cupola Operation
H. Pouring
I. Miscellaneous

Makes Time Study on Apprentice Contest Molders

AS an indication of the interest taken by at least one company in the National Apprentice Contests staged each year in connection with the Annual Convention of the American Foundrymen's Association by its Apprentice Training Committee, the Continental Roll & Steel Foundry Co., East Chicago, Ind., conducted a time study on its entrants in the steel molding contest.

Materials and equipment were arranged on the floor for each of the contestants and the individual contestant had to select the proper tools, etc., from the array during the process of molding the casting for the contest. Figure 2 shows the arrangement of the various tools, materials and equipment for each contestant, and consisted of the following: 13x18x5-in. flasks; 13x18x6-in. flasks; wooden bottom boards, 14x19-in.; facing sand; backing sand; hand rammer; bench air rammer; riddle; parting powder; gate sticks of the following sizes: 1½, 2 and 2½-in. round; two riser sticks of the following sizes: 2, 2½, 3, 3½, 4, 4½-in. round; two riser sticks of each of the following sizes: 3x5-in, 3x6-in, 2x4-in., 2½x4-in.; ⅜-in. bolt for drawing pattern; vent rods; rawhide hammer; wood and steel wedges (various sizes); runner cups; cores; finishing nails (various sizes); horseshoe

nails; cool-head nails; coil chills; and internal chills.

Figure 1 shows the results of the time study made on one of the Continental Roll & Steel Foundry Company's entrants in the steel molding contest.

Contests for Apprentices in Molding and Patternmaking Set for 1942

THE A.F.A. Apprentice Committee announces that the 1942 competitions for gray iron molding, steel molding, nonferrous molding and pattern making have been approved.

These competitions are open to indentured apprentices in any shop, following the rules and regulations which are the same as have been in force for the past several years. Prizes of $30, $20 and $10, respectively, for the first, second and third place winners in each of the four competitions of the national contest have been approved by the A.F.A. Board of Awards.

The committee furnishes blueprints for the pattern making competition and patterns for the three molding competitions. Local competitions may be held either by individual foundries and pattern shops or by groups or chapters. Individual local plants are privileged to send in one entry in each of the four classes, while those holding group contests are permitted to send in to the national display three entries in each class.

The A.F.A. Apprentice Contest Committee is composed of the following: *Chairman,* S. M. Brah, International Correspondence Schools, Chicago, Ill.; Frank C. Cech, Cleveland Trade School, Cleveland, Ohio; H. L. Charlson, American Steel Foundries, East Chicago, Ind.; J. Morgan Johnson, Tri-City Manufacturers' Association, Moline, Ill.; C. W. Wade, Caterpillar Tractor Co., Peoria, Ill.; and G. A. Zabel, Universal Foundry Co., Oshkosh, Wisconsin.

Those desiring to have their apprentices compete in the contests should address the American Foundrymen's Association, 222 West Adams St., Chicago, Ill.

Fig. 2—Equipment and materials used by steel molding contest entrants of the National Apprentice Contest for the Continental Roll & Steel Foundry Company's time study.

CONTINENTAL ROLL & STEEL FOUNDRY COMPANY

OBSERVATION SHEET

DIVISION ______ SHEET (A)

PIECE APPRENTICE CONTEST — ORDER NO. — PATT. NO. #3
MADE IN 13" X 18" FLASK — MACH. NO. — DEPT.
DRAWING — COPE 6" DRAG 5" SQ. FT. — VOL. — CU.FT.

START AT 9:10 AM

DETAIL OPERATIONS	CONTINUOUS TIME	INDIVIDUAL TIME
MOLD DRAG		
1 LOOK PATT OVER	16	16
2 PLACE DRAG FLASK	26	10
3 PLACE + WEDGE PATT	1 14	88
4 RIDDLE FACING + FACE	2 16	1 02
5 SCOOP + RAM HAND	3 51	1 35
6 AIR RAM	4 31	80
7 STRIKE + BOARD	5 12	81
8 ROLL DRAG OVER	5 52	40
9 CUT PARTING	9 58	4 06
MOLD COPE + CLOSE		
10 PLACE FLASK + COPE HALF PATT	9 96	38
11 SELECT HEADS + GATE	12 17	2 21
12 PARTING POWDER	12 42	25
13 RIDDLE FACING + FACE	14 64	2 22
14 SCOOP + RAM HAND	15 12	48
15 AIR RAM	15 78	66
16 CUT OUT + PLACE HD	16 47	69
17 FACE + RAM HAND	17 29	82
18 SCOOP + AIR RAM	18 66	1 37
19 DRAW HEADS + SLICK	19 99	1 33
20 DRAW COPE	20 19	20
21 DRAW COPE PATT + CUT OUT HDS	23 34	3 15
22 STAMP NUMBER IN COPE	23 54	20
23 DRAW DRAG PATT	24 05	51
24 PATCH DRAG + CUT GATE + 2 PUMPERS	30 28	6 23
25 SET CORE IN DRAG + VENT	31 54	1 26
26 CARRY DRAG + COPE OUT	32 79	1 25
27 CLOSE UP MOLD	33 26	47
28 CLAMP PLACE CUP + COVER	34 60	1 34

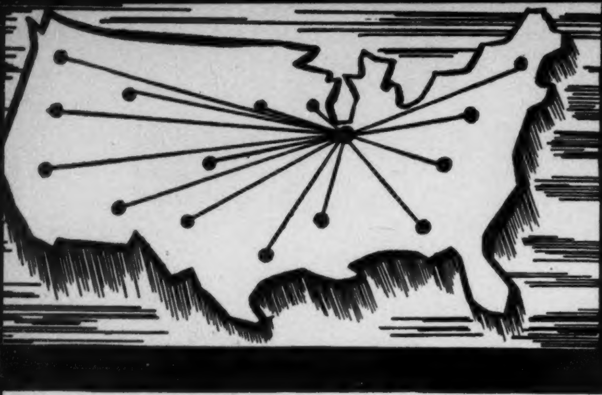
FINISHED AT 9:45 AM

OBSERVED BY NORTON
ON OPERATORS GEORGE GAVRILOV
APPROVED BY M. RINTZ
APPROVED BY
APPROVED BY F. D. LAUER
DATE 2-25-41

REMARKS: SIZE OF HEADS
1½" X 3" HEAD
1½" ROUND
1½" X 1¾" HEAD
2" ROUND GATE

MIN. TIME IN MINUTES 34.60
PLUS—
TOTAL TIME IN MINUTES
TOTAL TIME IN HOURS
BASE RATE
PRICE PER PIECE
T. S. NUMBER

Fig. 1—Chart showing time spent and operations performed by apprentice in making his mold.



Chapter Activiti

Philadelphia Celebrates Golden Anniversary

By B. H. Bartells,* Philadelphia, Pa.

THE regular meeting of the Philadelphia chapter was held at the Engineers Club, October 10, at which time was observed the fiftieth anniversary of the founding of the Philadelphia Foundrymen's Association. Chapter Chairman Harry Reitinger, U. S. Pipe & Foundry Co., Burlington, N. J., presided over the gala affair that attracted 140 members and guests. Among the guests present were several men who were active in the early days of the chapter.

The after dinner speaker, George C. Davis, consulting metallurgical chemist, spoke on "Recollections of Men and Methods in the Past Fifty Years." Mr. Davis was one of the active members of the Association during the early years of its existence, and one of the first speakers. His talk covering methods used in the foundry fifty years ago and improvements and advances since that time proved most interesting.

The main speaker of the evening, Norman Mochel, metallurgical engineer, Westinghouse Electric and Manufacturing Co., spoke on "Steel Castings and Specifications." Mr. Mochel outlined the present trends in specifications of steel castings, among which are stabilizing and simplicity, passing of certain superfluous tests and tendency to rationalize requirements for physical properties. He gave a brief history of pioneering developments in the steel casting field carried out in the geographical area covered by the Philadelphia chapter, and to the number of progressive steel foun-

*Instructor, University of Pennsylvania, and Reporter, Philadelphia chapter.

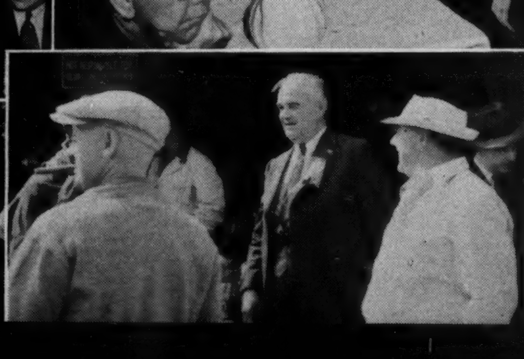
Pictures taken at the recent Chicago chapter outing held at the Lincolnshire Country Club. In the second row of pictures (center) sits a few visitors from the Michiana chapter, led by Chapter Chairman E. C. Bumke, second from right. (Center, right)—Left to right, J. C. Gore, chairman, outing committee, chats with D. D. Cameron and D. N. Gellert. (Center, left)—Jack Eberhardt and Oscar Peterson sit at a special table next to the Chicago chapter officers. Eberhardt and Peterson arrived late and, upon finding practically all the places filled, made a bet that with nearly 1,000 foundrymen clamoring for food they could get a table up in front and be served promptly. The picture reveals their success.

(Photos courtesy J. C. Thomas and E. F. Wiechman, Whiting Corp., Harvey, Ill.)








dries in the area. He referred to the number of existing specifications covering steel castings, he strongly favored the creation of commercial specifications through the organization and methods of the American Society for Testing Materials. Mr. Mochel then discussed many present and future trends, as he sensed them, in the matter of steel castings and specifications for steel castings. Simplification of grades, reduction of some types of testing, elimination of unnecessary and meaningless requirements, development of untested grades, physical properties, marking requirements, welding defects, use of castings in welded construction, radiographic practices, desire for rough machined castings, use of pilot castings, and certain trends that he believes will bring about changed methods of specifying soundness and properties for extreme conditions of service were among the many subjects discussed from the viewpoint of trends.

Cupola Operation Discussed at Central Indiana

By R. A. Thompson,* Indianapolis, Indiana

SPEAKING before approximately 100 Central Indiana foundrymen at the Washington Hotel, Indianapolis, October 6, B. P. Mulcahy, research engineer, Citizens Gas & Coke Utilities, Indianapolis, gave an interesting and all important talk on "Cupola Operation and Raw Materials." Chapter Chairman H. B. Harvey, president, Indiana Foundry Corp., Muncie, had charge of the meeting.

The speaker began his discussion with illustrations covering general facts concerning the production of coke. He then presented various items that affect cupola operation, raw materials and carbon control; and concluded his presentation showing the relation of foundry melting practice and its influence on each foundryman's future business.

*Electric Steel Castings Co., and Secretary, Central Indiana chapter.

Kuniansky Opens Chesapeake Chapter Season

By Fred Bruggman,* Baltimore, Md.

THE Chesapeake Chapter opened its 1941-42 season on September 26 at the Engineers' Club, Baltimore, Md. Approximately 75 members and guests were in attendance.

Following the dinner Chapter Chairman E. W. Horlebein, Gibson & Kirk Co., introduced Frank G. Steinbach, editor, *The Foundry* and chief, foundry equipment and supplies unit, OPM, who explained a number of the details of the recently issued Preference Rating Order P-22 as regards foundries, their customers and suppliers.

The chapter was pleased to receive a telegram from C. E. Westover, executive vice-president, American Foundrymen's Association, which extended best wishes for successful meetings throughout the coming year.

Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., was presented to the chapter as the speaker of the evening. Mr. Kuniansky talked about the use of scrap in the present emergency and proved to be an interesting and timely subject. He pointed out that due to a shortage of pig iron and scrap steel his company is using stove plates and automotive scrap. By careful manipulation they are getting results. He also mentioned that they were installing a briquetting machine for using borings and which they hope will give them another source of supply for scrap materials.

*Gibson & Kirk Co., and Reporter, Chesapeake Chapter.

Chicago Chapter Outing Sets Attendance Record

THE annual outing of the Chicago Chapter was held September 27 at the Lincolnshire Country Club, Crete, Ill. The attendance was the largest ever, with over 400 golfers taking part in the tournament and over 1000 served at the dinner. This turnout was very gratifying to Chi-

Pictures taken at a current meeting of the Chesapeake Chapter.
(Photos courtesy F. Bruggman, Gibson & Kirk Co.)

cago Chapter officials as they had worked hard to make this one of the best outings. Much credit is due the various committees who planned the outing and J. C. Gore, Werner G. Smith Co., *chairman*, Outing Committee.

The morning and afternoon saw golfers swarming all over the four courses of the country club with murderous gleams in theirs eyes as they swung and missed, and occasionally hit, a small pellet commonly known as a golf ball. Most golfers, considering the scores handed in, found that this little creature had the tendency to find its way in bushes and weeds, behind trees, sand traps and gopher holes. This necessitated the use of two strokes of which many are masters and have learned to use without advice from any pro, the "kick out shot" and the "throw out shot." However, everyone of the Daniel Boones that registered going out came back in and no searching parties were required. Baseball, horseshoe pitching and "elbow bending" was carried on by those who desired an easier pastime.

The afternoon entertainment featured a bait casting exhibition and a wrestling and boxing show.

Following the day's festivities the 1000 foundrymen retired to the big tent for dinner, the awarding of the prizes and a floor show.

A wide variety of entertainment helped the Chicago chapter outing to be a real one. The man so comfortably settled in the chair and wrapped so snugly in his coat (second row of pictures—center) is none other than Charley Kawin, Chicago chapter treasurer. Bottom, left—Chapter Chairman Henkel looks over the prizes

(Photos courtesy J. C. Thomas and E. F. Wiechman, Whiting Corp., Harvey, Ill.)

Defense Production Problems Discussed at Metropolitan Meeting

By K. A. DeLonge,* New York, N. Y.

PRIORITIES, metal shortages and government alloys prominent in the defense program were on the non-ferrous foundrymen's griddle at the opening meeting of the Metropolitan Chapter held October 6, at the Essex House, Newark, N. J. E. W. Horlebein, president, Gibson & Kirk Co., Baltimore, Md., the speaker of the evening, addressed a group of some 60 guests and members. Sam Tour, Lucius Pitkin, Inc., New York, served as technical chairman.

As an introduction to his talk, Mr. Horlebein recounted the steps taken by the government in reaching the present status of the priorities system. He counseled the attending foundrymen to take their priority problems to the local priority offices set up in Federal Reserve Banks in preference to making a trip to Washington with each and every problem. Commenting on the possibilities that priorities will be replaced by outright allocation of metals. Mr. Horlebein prophesied that the taking of inventories of stocks on hand would become a monthly requirement.

Getting down to actual foundry problems the speaker told of his success in using bakelite bonded plywood in place of aluminum in making match-plates. This fabricated board has proved its worth both from a service and economic standpoint, he said. Casting finish was a problem in the speaker's shop when an attempt was made to pour 8 or 10 different non-ferrous alloys daily using only one molding sand. The answer to this difficulty was the use of different facing sands

*International Nickel Co., and Secretary, Metropolitan Chapter.

prepared by a sand muller. Mr. Horlebein emphasized the importance of pouring temperature control in obtaining specified physical properties. Metal temperature can be judged by the length of time the charge is in the furnace, although it is advantageous to determine the actual temperature by an immersion pyrometer. The practice of preheating ladles in an inverted position was described as being more efficient than the usual method of preheating and eliminating the danger of impregnating the ladle with oil which usually leads to scrapping the first ladle-full of metal poured.

The talk was concluded with a discussion of alloys being cast for the government in the speaker's shop, including manganese bronze, modified gun metal and Monel metal. In the discussion which followed Mr. Horlebein described various methods of molding castings and test bars. The question of inspection of government castings was of interest to the group and the speaker's comments on this subject were well received. An open discussion followed the talk.

Cupolas and Converters Discussed at Ontario Chapter Meeting

By G. L. White,* Toronto, Ontario

THE opening meeting for the 1941-42 season, Ontario Chapter, was held at the Royal Connaught Hotel, Hamilton, Friday, September 26, with approximately 90 foundrymen present. Chairman N. B. Clarke, Steel Co. of Canada, Ltd., Hamilton, presided. The principal speaker was A. W. Gregg, foundry engineer, Whiting Corporation, Harvey, Illinois.

Although foundrymen agree that the cupola is the heart of the foundry, it is evident that the melting department is usually the last one to be modernized. Supervision of cupola melting is frequently entirely inadequate and it has been shown that men with relatively little experience on the cupola, but willing to check every detail carefully, may attain good results.

Details to be considered in starting up the cupola include repair of refractories and the placing of a suitable sand bottom for which specifications should preferably be set up by the sand laboratory. In starting the cupola, coke should be added to 80 per cent of the proper height and the cupola burned in under natural draft, taking two or three hours in order to dry slowly and heat up gradually. Then by adding coke to the right height, and turning on the wind, hot iron may be secured at the start of the operation, a procedure which is cheaper than pigging some of the first iron poured.

It is bad practice to try to squeeze the last drop of molten metal out of the cupola, as the last half hour of operation can do more damage to the lining than the rest of the run. Shutting down of the cupola is undesirable but can be done when necessary. Air weight control is becoming very popular in cupola operations since under this system adjustments are automatically made to deliver a uniform amount of oxygen under all atmospheric conditions. Mechanical charging has made progress because of labor savings, greater safety, and its contribution to even cupola operation.

Steel Converters

In discussing steel converters, Mr. Gregg pointed out that the use of electric eye control on side blow converters had resulted in remarkable improvement in its operation, with the consequence that a good many converters have been installed in steel foundries in recent months. With electric eye control it is possible to get the end point of the blow very accurately, within a fraction of a second. Under these conditions, converters are operated with results equal to those obtained from electric furnaces and several shops with converters will undertake to meet any specifications that can be met in the electric furnace. Under normal operating conditions the side-blow converter does not offer much lower conversion costs than the electric furnace but it does offer means for elimination of the serious demand factor associated with electric furnaces in times of slack operation. The rapid cycle of the converter has made it possible to secure a more continuous supply of hot steel and in combination with an electrically-heated ladle this problem is completely solved.

*Westman Publications, Ltd., and Secretary-Treasurer, Ontario Chapter.

Pictures taken at a recent meeting of the Ontario chapter. Top, left—Seated at the speakers' table are (left to right) Director Robert Robertson, International Harvester Co. of Canada, Ltd., Hamilton; Director T. D. Barnes, Wm. R. Barnes Co., Ltd.; Hamilton; Chairman N. B. Clarke, Steel Co. of Canada, Ltd., Hamilton; A. W. Gregg, speaker, Whiting Corp., Harvey, Ill.; Vice Chairman, J. J. MacFadyen, Galt Malleable Iron Co., Ltd.; and Director J. Thwaites, Beatty Bros., Ltd., London. Top, right—Discussing the evening's program are (left to right) N. B. Clarke, Robert Robertson, T. D. Barnes and J. J. McFadyen. Bottom—Candid shots taken after the meeting.
(Photos courtesy S. Hutchinson, Hutchinson & Sons, Toronto, Ont.)

Foundry Training

T. H. Scott, field representative, Dominion-Provincial War Emergency Training Program, offered the cooperation of his organization with the foundry industry in the training of men for the foundry. Any course of this type would be set up under advice from the foundry industry on the exact nature of the training most suited to its needs.

Redmond Speaks at Western New York

By Eliot Armstrong,* Buffalo, N. Y.

THE largest attendance at any business meeting in the chapter's history greeted Western New York Chapter officers when the first meeting of the chapter was called to order Friday, October 31, at the Hotel Touraine.

*Inter-Allied Foundries of New York State, and Secretary, Western New York Chapter.

Mark A. Daly, executive vice-president, Associated Industries of New York State, gave a short coffee talk on "You Should Know." The speaker presented a new and up to the minute picture of the dislocations taking place in our non-defense industries and summarized the situation in a most interesting manner.

Speaker for the evening was Frand Redmond, who presented a chart talk on "How Do They Get That Way?" Mr. Redmond painted a most instructive, entertaining and humorous picture of how individuals muff opportunities to promote safety.

Central Indiana Holds First Outing

By J. P. Lentz,* Indianapolis, Ind.

FINALLY deciding to follow the general practice of other chapters, the Central Indiana chapter sponsored a stag outing on Saturday, September 13, at the Lakeshore Country Club on the outskirts of Indianapolis. The affair was a real success, bringing together over 200 foundrymen from cities of Central Indiana. H. B. Harvey, chapter chairman, picked a good outing committee. This committee under the direction of B. P. Mulcahy, Citizens Gas and Coke Utilities, functioned perfectly, supervising golf, horse shoe pitching, shuffle board, ping pong and baseball games, beside serving beer to the thirsty. Working faithfully to make the outing a success, Mulcahy had as assistants Robert Langsenkamp, Langsenkamp Wheeler Brass Works; J. P. Lentz and E. G. Schmidt, Jr., International Harvester Co.; L. E. Davis, Republic Coal and Coke Co.; R. A. Thomas, Electric Steel Castings Co., and numerous others whose names were not reported to the editor. To these latter our apologies are due.

The evening was completed with a bountiful dinner served in the clubhouse and the distribution of prizes to the "lucky" participants in the days' events.

*International Harvester Co., and Treasurer, Central Indiana Chapter.

A big turnout of Central Indiana foundrymen helped to make that chapter's first outing a successful affair. Center, right—Bob Langsenkamp (facing camera) had charge of the golfing tournament. Bottom, left (left to right)—Chapter Chairman H. B. Harvey and Outing Chairman B. P. Mulcahy talk things over with three other members of the outing committee.

(Photos courtesy S. C. Wasson, National Malleable & Steel Castings Co., and Mr. Saas, Citizens Gas & Coke Utilities, Indianapolis, Ind.)

Michiana Has Ideal Day for Third Annual Outing

SUCCESS and more success comes by experience, as was realized by the Michiana chapter holding its third annual fall outing. Gathering at the Christiana Country Club near Elkhart, Ind., a capacity crowd of 216 participated. Chapter Chairman Ed Bumke had as the outing ring leader V. C. Bruce, Buckeye Products Co. Serving with Bruce on the general committee were R. E. Patterson, Elkhart Foundry & Machine Co., and W. V. Johnson, Oliver Farm Equipment Co. Special activity committee directors were E. C. Bumke; E. Gustafson, Sibley Foundry & Machine Co.; J. Brajcki, Bendix Products Div.; C. Proseus, Elkhart Foundry & Machine Co., and W. A. Bachman,

New York Central Railroad Foundry.

The bait casting contest proved more than ever an attraction and the competition was keen. The ball game was won by the foundrymen, 13 to 12, over the vendors. Golf brought in some low as well as high scores, and the horse shoe pitching showed that Michiana can challenge any other chapter to a bout, for 97 and 98 "ringers" out of a possible 100 is scoring in any man's contest.

An excellent dinner of fried (really hot) chicken, a good floor show and prize awarding completed a happy but strenuous day.

Reese and Tamor Address Central New York Meeting

By G. M. Thrasher,* Elmira, N. Y.

DONALD J. REESE, International Nickel Co., New York City, discussing "Cupola Operation," and David Tamor, plant metallurgist, American Chain & Cable Co., York, Pa., discussing "Some Causes of Scrap in the Brass Foundry," were the speakers before the October 10 meeting of the Central New York chapter. This was the chapter's first meeting held at Elmira, N. Y. Some 20 members from outside Elmira spent the afternoon inspecting the interesting foundries of the Elmira Foundry Corporation, Elmira, N. Y., where the operation of balanced blast cupolas and permanent mold castings were of special interest.

Dinner was served at Langwell Hotel to 90 members and with late arrivals the attendance was over 100. An entertainment feature consisted of bits of sleight-of-hand, performed by Lewis Thrasher. Following the dinner, the group was divided into two sections, the gray iron section listening to Mr. Reese, who gave the second of a series of talks before the chapter on cupola operation. The non-ferrous section heard Mr. Tamor's presentation, who with lantern slides pictured the effects of shrinkage and contractions due to the three stages of cooling of metal in the mold.

The September 12 chapter meeting was held at the Onondaga Hotel, Syracuse, with Mr. Reese giving his first talk and Grafton M. Thrasher, R. Lavin & Sons, Inc., Elmira, talking on "Some Common Brass Foundry Alloys."

The chapter is endeavoring to present two speakers at each meeting, items being of interest to the non-ferrous and gray iron foundries, the predominant foundry interest of the district.

*R. Lavin & Son, Inc., and Chairman, Non-Ferrous Program Committee.

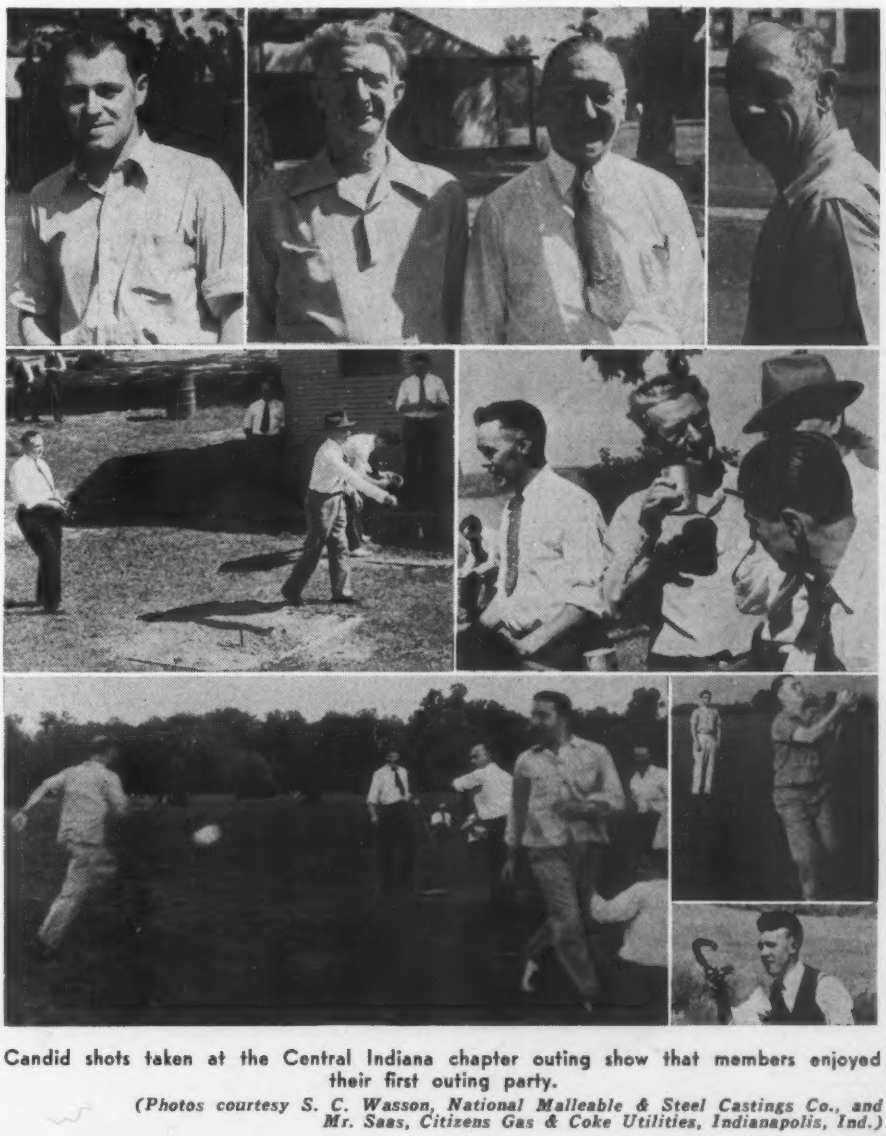
Northern California Chapter Sponsors Annual Outing

By Geo. L. Kennard,* San Francisco, California

THE annual stag outing and golf party of the Northern California Chapter was held October 10 at the Sequoyah Country Club. The day was spent in playing golf, pitching horseshoes and tennis. Others played ping-pong and cards and some gathered around the swimming pool and watched the water sports.

After the day's activities a dinner was served to approximately 100 foundrymen, during and after which there was group singing led by the entertainment chairman, Pete Valentine, Del

*Northern California Foundrymen's Institute, and Secretary-Treasurer, Northern California chapter.



Candid shots taken at the Central Indiana chapter outing show that members enjoyed their first outing party.

(Photos courtesy S. C. Wasson, National Malleable & Steel Castings Co., and Mr. Saas, Citizens Gas & Coke Utilities, Indianapolis, Ind.)

Monte Properties Co., who had provided talented assistance and also a song book for everyone. The awarding of prizes was handled by Chapter Chairman E. M. Welch, American Manganese Steel Div., American Brake Shoe & Foundry Co. A special prize, in the heavyweight class, was presented to Sam Russell, Phoenix Iron Works. It was a pig made of iron.

Many visitors were among the crowd, one of which was L. L. Ventre, mayor, Stockton, Calif., who operates Augustine Brass Castings, Stockton. Other guests also were introduced.

Important Problems Discussed at Wisconsin Sectional Meetings

By G. K. Dreher,* Milwaukee, Wis.

MEETING for the first time in the 1941-42 year, the Wisconsin chapter got off to a flying start by having over 200 present at their initial meeting.

Prior to the group meetings the chapter had the opportunity to see the new sound movie produced by the Illinois Clay Products Co., Chicago, Ill., as shown by A. S. Nichols, vice president.

Following the showing of the movie the members split into four groups, namely: gray iron, malleable, non-ferrous and steel. The gray iron section was under the chairmanship of Frank Kulka, general superintendent, Motor Castings Co., Milwaukee, Wis. Speakers for this session were H. Pfeiffer, Allis-Chalmers Mfg. Co., and A. Fischer, Jurack Pattern Co., both of Milwaukee. Their subject was "Design of Patterns and Its Effect in Foundries." These men discussed the reason for using metal patterns on air cooled cylinders and the correlation of blue print reading by the foundryman and design of patterns affecting final casting results. Further discussion explained the method and reasons for splitting core-boxes and patterns and the necessity for apprentices to work in both the foundry and pattern shop.

Stephen Pohl, Federal Malleable Co., West Allis, Wis., was chairman of the malleable group, and Frank L. Harris, asst. superintendent, Belle City Malleable Iron Co., Racine, Wis., was the speaker. The Milwaukee Malleable Club conducted a scrap clinic in conjunction with this meeting. Sample castings which caused production difficulties in the foundries were examined and discussed by those present. Casting defects caused by furnace conditions, melting practice, atmospheric changes and types of charges were discussed at great length at this meeting.

On a current program of the Wisconsin chapter was (left) A. S. Nichols, vice president, Illinois Clay Products, Chicago, who showed sound movies. With him is M. J. Carpenter, president, Carptenter Bros., Inc., Milwaukee, past treasurer of the chapter.

(Photo courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee, Wis.)

"Electric Furnace Melting" was the topic of conversation at the steel meeting. Fred Pritzlaff, foundry superintendent, Falk Corp., Milwaukee, Wis., served as chairman. Speaker at this session was John Cannon, chief melter, Milwaukee Steel Foundry Co., Grede Foundries, Inc. The speaker touched briefly upon the steel melting practice at his own plant, where they operate both acid and basic furnaces. He highlighted the characteristics of each practice, and the methods followed. The discussion covered such items as stainless steel, chrome losses, roof life and lining problems.

"Non-Ferrous Foundry Sands" was presented at the non-ferrous meeting by W. K. Wallace, Foundry Materials, Inc., Milwaukee, Wis. Walter Edens, metallurgist, Ampco Metal, Inc., Milwaukee, Wis., served as meeting chairman. The speaker spoke at some length on the geology of foundry sands, showing the types and locations of various sand producing areas. Emphasis was placed on the desirability of having the proper structure, but more particularly the proper grain distribution in order to develop maximum properties. Also discussed were synthetic versus natural bonded sands, as well as the use of bonding clays as a means of maintaining strength in natural sands.

*Mgr., Ampco Metal, Inc., and Secretary, Wisconsin chapter.

Wisconsin Regional Conference Plans Formulated

By G. M. Pendergast,* Milwaukee, Wis.

PLANS for the fifth annual foundry conference, to be held under the joint auspices of the Wisconsin Chapter and the college of metallurgy, Wisconsin University, at the Schroeder Hotel, Milwaukee, Wis., February 26 and 27, 1942, were formulated at a meeting of the conference committee in Milwaukee, Friday, October 10.

Howard Waldron, Nordberg Mfg. Co., Milwaukee, vice president, Wisconsin Chapter, is general chairman of the conference. He will be assisted by a general conference committee including T. E. Ward, Badger Malleable & Mfg. Co., Milwaukee, *secretary*, and R. F. Jordan, Sterling Wheelbarrow Co., Milwaukee, *treasurer*. The following names constitute the other members of the committee: Prof. Joseph F. Oesterle, engineering college, Wisconsin University, Madison; A. C. Ziebell, Universal Foundry Co., Oshkosh; David Zuege, Sivyer Steel Castings Co., Mil-

*Geo. M. Pendergast & Co., Inc., and chairman, publicity committee, Wisconsin Regional Conference.

The "hand out department" at the Birmingham outing is getting the lull before the storm. Looks like they had plenty to feed those southern foundrymen.

waukee; George K. Dreher, Ampco Metal, Inc., Milwaukee; Harry E. Ladwig, Allis-Chalmers Mfg. Co., Milwaukee; John Bing, A. P. Green Fire Brick Co., Milwaukee; F. A. Pritzlaff, Falk Corp., Milwaukee; William Hambley, Allis-Chalmers Mfg. Co., Milwaukee; B. D. Claffey, General Malleable Corp., Waukesha; R. C. Woodward, Bucyrus-Erie Co., Milwaukee; L. V. Tuttle, Koehring Co., Milwaukee; D. I. Dobson, General Malleable Corp., Waukesha; Roy M. Jacobs, Standard Brass Works, Milwaukee; R. Krumbiegel, Ampco Metal, Inc., Milwaukee; Walter Gerlinger, Walter Gerlinger, Inc., Milwaukee; George M. Pendergast, Geo. M. Pendergast & Co., Inc., Milwaukee; A. C. Haack, Wisconsin Gray Iron Foundry Co., Milwaukee; A. Higgins, Allis-Chalmers Mfg. Co., Milwaukee; Lee Everett, Kaukauna Machine Corp., Kaukauna; Carl Haertel, Falk Corp., Milwaukee; S. Phol, Federal Malleable Co., Milwaukee; A. M. Fischer, Jurak Pattern Co., Milwaukee, and R. G. Metzger, Milwaukee.

The sectional chairmen will be A. C. Haack, gray iron; R. C. Woodward, steel; A. Higgins, non-ferrous, and D. I. Dobson, malleable. Other chairmen include George Dreher and Harry E. Ladwig, speakers; George M. Pendergast, publicity; Roy M. Jacobs, arrangements; R. F. Jordan, registration; Walter Gerlinger, table reservations, and T. E. Ward, entertainment.

Defense Talk Attracts Many at St. Louis

By Jack Kelin,* St. Louis, Mo.

LT. COL. W. CARTER BLISS, Division of Contract Distribution, OPM, St. Louis, Mo., gave an interesting talk on the defense program to 100 foundrymen gathered at the De Soto Hotel, St. Louis, October 9. Carl Morken, Carondelet Foundry Co., and chapter chairman, presided.

The topic of the speaker's discussion was "Defense, Past, Present and Future." Mr. Bliss outlined the progress of the defense program and gave various facts and figures concerning the work that is being done and has been done. The present setup of the defense program is functioning well and he said the full cooperation of the foundry industry and those affiliated with it is urged.

Questions in connection with the working of priorities were answered by A. H. Ricker and George Steffans, Priorities Division, OPM.

*Federated Metals Div., A. S. & R. Co., and Secretary-Treasurer, St. Louis District chapter.

McElwee Opens Western Michigan Meetings

By Max Amos,* Muskegon, Mich.

THE Western Michigan chapter launched its 1941-42 season with the first regular meeting of the year on October 6, at the Occidental Hotel, Muskegon, Mich.

Following dinner, Chapter Chairman D. F. Seyferth, West Michigan Steel Foundry Co., read a telegram from C. E. Westover, executive vice president, American Foundrymen's Association, wishing success to the chapter during the coming year. The program was then turned over to A. E. Jacobson, Grand Haven Brass Foundry, Grand

*Standard Automotive Parts Co., and Secretary-Treasurer, Western Michigan chapter.

Many new and old faces were seen at the Birmingham chapter outing and barbecue. A familiar face seen at nearly all chapter activities is that of C. B. Saunders—top row of pictures center.

(All photos of Birmingham outing submitted through the courtesy of Gene Welchel and Wm. W. McCullough, American Cast Iron Pipe Co., Birmingham, and Ralph Morrow, Birmingham.)

A lot of laughs were had by Birmingham chapter members as they watched the leather slingers. Looks like a good right has gone wrong in this picture.

Haven, who in turn introduced the speaker of the evening, R. G. McElwee, foundry engineer, Vanadium Corp. of America, Detroit, Mich.

Mr. McElwee gave a very informative and enlightening talk on the subject "Making the Most of Available Materials," which seemed extremely appropriate at the present time as indicated by the many questions asked the speaker at the conclusion of his speech.

A sound movie was shown through the courtesy of Illinois Clay Products Co., Chicago, Ill.

Synthetic Sands Discussed at Quad City Meeting

By J. Morgan Johnson,* Moline, Ill.

THE first meeting of the Quad City chapter was held at the Le Claire Hotel, Moline, Ill., September 15, with some 75 members and guests attending. Alex Matheson, French & Hecht, Inc., Davenport, Iowa, and chapter vice chairman, presided over the initial meeting.

The main speaker of the evening was N. J. Dunbeck, vice president, Eastern Clay Products Co., Inc., Eifort, Ohio, who spoke on the subject "Synthetic Sands." The speaker gave a very clear definition as to what a synthetic sand was, why it was used in the foundry industry, and the numerous mixtures available for various types of castings. In concluding his discussion, Mr. Dunbeck presented information as what to look for in a sand, such as grain hardness, refractory qualities, shape and expansion.

A very interesting and practical discussion of the author's paper followed the meeting.

*Tri-City Manufacturers' Assn., and Secretary-Treasurer, Quad City chapter.

New England Foundrymen Gather at Annual Outing

By M. A. Hosmer,* Boston, Mass.

THE annual outing of the New England Foundrymen's Association was made a huge success when Lady Weather was for and not against the good wishes of some 60 members and guests who were determined to have a day of rest and relaxation at the Pawtucket Golf Club. As it turned out, Old Man Sol flooded the place with sunshine and many took advantage of the opportunity to play golf, baseball and other sports. Walter Saunders, Walter Saunders & Co., Providence, R. I., had charge of the ball game and was kept busy from luncheon till dinner keeping track of the score.

After the strenuous affairs of the morning and afternoon, the members and guests sat down to enjoy a dinner and a floor show.

The committee for the outing was composed of C. E. Andrews, Whitehead Bros. Co., *chairman;* William G. Rich, Providence Gas Co., and A. W. Calder, New England Butt Co.

*Chemist, Hunt-Spiller Mfg. Co., and Reporter, New England Foundrymen's Association.

Potratz Speaks at Southern California Meeting

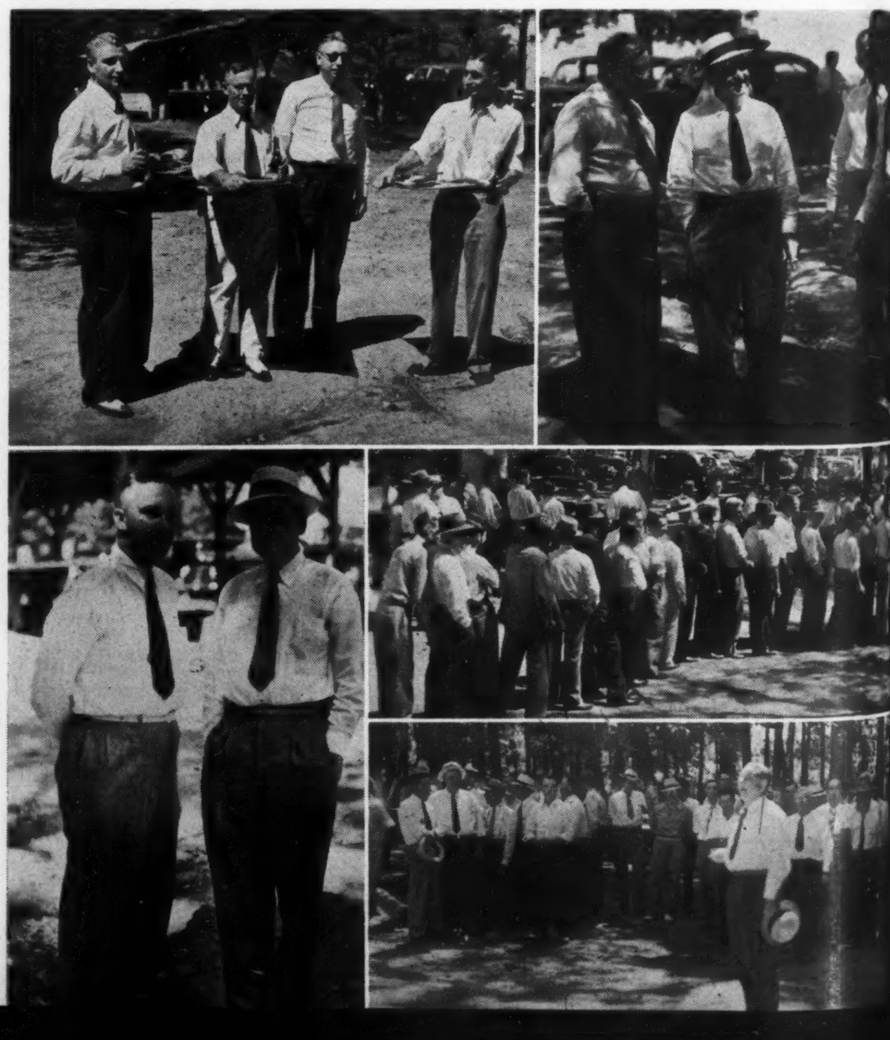
By W. D. Bailey, Jr.,* Los Angeles, California

C. E. POTRATZ, consultant, Production Division, OPM, addressed the first meeting of the Southern California chapter at the Elks Club, September 25. The meeting was in charge of Chapter President B. George Emmett, Los Angeles Steel Casting Co.

The lecturer gave the history of the Federal Reserve Bank and then told of its activity in refer-

*West lectric Casting Co., and Secretary, Southern California chapter.

Anxious smiles of anticipation can be seen on the faces of many members as they stand in line waiting to receive their delicious barbecued spare ribs, or was it chicken? Left, bottom—Chapter Chairman J. A. Bowers and Past President L. N. Shannon. Top, right—L. N. Shannon and Past Chapter Chairman R. R. Deas, Jr., get a laugh from a member's remark.



ence to the Office of Production Management. He discussed in brief the Defense Supplies Rating Plan and in more detail Defense Service Contracts and how the Federal Reserve Bank will assist small industries to become sub-contractors. He gave a very clear picture of the operation of the Preference Rating Certificates and blanket preference orders.

Kresge Talks on Personnel Work at N.I.-S.W.

By J. R. Cochran,* Rockford, Ill.

SPEAKER at the October 14 meeting of the Northern Illinois-Southern Wisconsin chapter meeting was R. C. Kresge, personnel director, Link-Belt Co., Chicago, Ill. Approximately 70 members and guests attended the meeting, over which Chapter Chairman G. K. Minert, Gunite Foundries Corp., Rockford, had charge.

"The Foreman's Part in Personnel Work" was the subject of the speaker's paper. Mr. Kresge pointed out that it was the top management's responsibility to make personnel relations work easier for the foreman. He also pointed out the value of job evaluation and rate setting as a method of keeping foundry employees satisfied with wages. The discussion that followed brought up some interesting points concerning job evaluation, merit rating of employees and the steps necessary to eliminate errors of favoritism.

*Sundstrand Machine Tool Co., Foundry Div., and Technical Secretary, Northern Illinois-Southern Wisconsin chapter.

Student Chapter Organizes for Year's Work

THE Association's only Student Chapter, that at the University of Minnesota, is starting its second year of activity. Organized last year, with its membership composed of 13 engineering students taking special foundry courses, its original number is expected to be increased considerably. The one graduate from the group last year is now with the Bendix Corporation at South Bend, working in the foundry technical department. This coming year some six more will graduate which is welcome news to those foundries which secure their services.

University of Minnesota students Jarl A. Haven, as president, and Sidney S. Silberg, as secretary-treasurer, will direct the Student Chapter this year. Fulton Holtby and Herbert Scobie of the university staff, teaching foundry practice, will act as faculty advisors.

The Student Chapter now has a big brother, as the 21st chapter of the Association, the Twin City, covering the Minnesota district, was formed last May.

Chicago Chapter Plans Course on Foundry Fundamentals

THE Chicago Chapter lecture course committee, under the chairmanship of L. F. Lottier, Peoples Gas Light & Coke Co., Chicago, is making plans for a course in the fundamentals of foundry practice. The program looks several years to the future. This year's sessions will be 14 in number and will be held each Tuesday, beginning January 6 and continuing weekly until April 7.

In contrast to previous lecture courses which covered the industry in a general manner, the new course is planned to give the details of foundry practices from raw materials to the finished product, including such phases as patternmaking, blue print reading, sketching, sand practices, molding, melting, metallurgy, coremaking, etc. Groups will be set up for each of the four divisions of the industry, namely, gray iron, steel, malleable and non-ferrous. It is planned to secure teachers from accredited schools to teach the various phases of the course. It also is planned to make the individual courses equivalent to similar ones in accredited schools. However, much of the material to be presented will not be found in any present school curriculum. Printed or mimeographed material will be supplied to those enrolled in the course and they will be asked to prepare for each session in a manner similar to that used in educational institutions. It is planned to run the course for similar periods, as is planned for this year, for three or four years and award certificates to those who complete the entire course.

The course is to be open to all foundry workers, particularly shop men and foremen, and is being given to prepare men, who are potential executives, for advancement.

New England Hears About Synthetic Sand

By M. A. Hosmer,* Boston, Mass.

SPEAKING before a group of New England foundrymen, numbering about 87, at the Engineers Club, Boston, was Charles Schureman, service engineer, F. E. Schundler & Co., Inc. Informative data was presented on the subject "Synthetic Molding Sands: Problems and Solutions." Presiding officer was Charles O. Butler, Warren Pipe Co. of Mass., Association president.

The speaker explained there were eight main problems in connection with the subject of synthetic sands, and he discussed each one in detail. The first one discussed was the selection of a base sand as to size and shape, depending on the size of and finish required on the casting. Number two concerns bonding clay. Three types of clay are available, kaolin or fire clay, western bentonite and southern bentonite. Where possible, a batch type mixture is very beneficial. The best method of keeping up the volume of the heap was to add a mixture of mulled old heap sand with sharp sand if necessary, and some clay bond. In the controlling of heaps the

*Chemist, Hunt-Spiller Mfg. Corp., and Reporter, New England Foundrymen's Association.

author stressed the value of the hot test. For his fifth point the speaker explained that casting finish is controlled largely by grain size. Moisture control constituted the sixth problem, as it is necessary to keep the moisture as low as possible. Point number seven was a discussion of sand expansion; and the last point considered some disadvantages of synthetic sands.

Use of Scrap Presented by Kuniansky at Cleveland

By Edwin Bremer,* Cleveland, Ohio

SECOND regular monthly meeting of the Northeastern Ohio chapter, held on October 9 at the Cleveland Club, was one of the largest ever held, with approximately 200 members and guests present. Frank Dost, chapter president, Sterling Foundry Co., presided. L. P. Robinson, Werner G. Smith Co., national director, spoke briefly to the assembled apprentices who were guests of the chapter, conveying greetings from national headquarters, and congratulated the winners in the national and local contests.

Frank Cech, Cleveland Trade School, chairman of the chapter's apprentice committee, presented bronze plaques awarded by the chapter to the foundries whose apprentices won recognition in the local apprentice contest. First prize in gray iron went to Bowler Foundry Co.'s Chester Blacksmith, and was accepted by William Goebert; second prize awarded to Westinghouse Electric's William Wehagen, and accepted by Fred Pascoe; third prize to Hill-Acme's Mike Slivka and accepted by George McNabb.

First and second prizes in steel molding were awarded to Crucible Steel's Bob Bina and Robert Miller, and accepted by Bruce Aitken; third prize went to West Steel Casting's Peter Opacich, and accepted by D. P. Lansdowne. First prize in nonferrous molding was given to Wellman Bronze's John Jasso, and accepted by H. G. Wellman. First prize in patternmaking was presented to Western Pattern's Albert Jazbinski, and accepted by Walter Seebeck; second prize went to Master Pattern's John Burczsky, and was accepted by Vincent Sedlon, and the third prize was awarded to Hill-Acme's Walter Zernechel, and accepted by Harry Zernechel, his father.

Principal address of the evening was presented by Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., who discussed "Use of Scrap in the Present Emergency." At the beginning of his talk the speaker pointed out that he would confine his remarks to his own firm, which operated four foundries producing a wide variety of castings ranging from plow parts and centrifugally cast pipe to chemical and machine tool castings weighing up to 40 tons. He also pointed out that the practice employed probably would not be directly applicable to another shop, but the procedure could be adapted after careful study of all factors.

Mr. Kuniansky said that foundrymen in general were too hidebound in their actions, preferring to follow tradition relative to raw materials and other practices used, rather than being willing to try something different. However, with the present scarcity of pig iron and other regular cupola scrap materials due to a variety of causes, the foundrymen of necessity must make the best of available materials—materials he would not have considered a few months previously.

Front slagging cupolas, according to Mr. Kuniansky, have many points of advantage, and desulphurization with soda ash accomplishes much more than just a reduction of sulphur, giving a much cleaner iron. In his plant about 7 pounds of soda ash are used per ton of iron in the cupola, and 5½ pounds per ton in the ladle. Melting 400 to 500 tons of iron per day, linings in the cupola last about 10 heats. Iron over the spout is about 2725 degrees and is poured at 2400 degrees. Balanced blast cupolas are used with 4000-pound charges consisting of 3500 pounds of scrap and 500 pounds of the previously described pig. Beehive coke mixed with pitch coke is employed to produce an iron high in total carbon.

He stressed that good results with available cupola material only result from constant vigilant control intelligently applied.

*Metallurgical Editor, "*The Foundry*," and Chairman, Publicity Committee, Northeastern Ohio Chapter.

Gamma-Ray Discussed at Cincinnati by Bland

By Henry M. Wood,* Cincinnati, O.

J. BLAND, assistant metallurgist, Brooklyn Navy Yard, New York, N. Y., presented a most interesting discussion of "Industrial Gamma-Ray Radiography" at the October 14 meeting of the Cincinnati District chapter. Presiding at this meeting was William Ball, Jr., Edna Brass Mfg. Co., chapter chairman. Approximately 42 attended the dinner, but the gathering numbered 60 by the time the technical session started.

Mr. Bland's previous experience with the production of radium and as consultant for the U. S. Navy Yard, Brooklyn, provided a good background for his excellent presentation. The author presented motion pictures showing the production of radium from its discovery in Colorado in 1896 to the Great Bear Lake district in the Canadian Northwest, where most of the world's present supply of radium is found. The ore as dug from the ground is concentrated at the mine, and the concentrate is flown to the refinery at Port Hope, Ont. The speaker presented slides of photographs of various defects in different kinds and shapes of castings as disclosed by radiography.

*W. W. Sly Mfg. Co., and Secretary, Cincinnati District chapter.

Alloy
CAS
A. E.
(Lond
pp. 4
metho
the pr
sium
data o
specific
num-si
minum
techniq
inspect
CAST
A. E.
(Lond
pp. 51
discuss
sium a
of view
tice, flu
gating
also str
sign.
MAN
of Ma
Dampin
Anders
Americ
2, June
measure
nese-cop
able de
have u
capacity
for the
describe
using
cussed.
values o
are due
phase n
vibration
reach a
tribution
decrease
is appro
to decrea
of the a
its disor
vibration
quenched
suggeste
to come
quenched
similarity
effect on
tween a
and an
In both i
metal ar
required
tion dam
attribute
NOVE

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, N. Y.

Alloy

CASTINGS. *"Light Alloy Castings,"* by A. E. Cartwright, *The Metal Industry* (London), vol. 48, No. 23, June 6, 1941, pp. 492-495. This paper describes the methods adopted at one Canadian shop for the production of aluminum and magnesium alloy castings. Herein is reported data on Canadian substitutes for British specifications, aluminum-zinc alloys, aluminum-silicon alloys, heat treatment of aluminum alloys, melting practice, molding technique and radiographic control and inspection. (Al.)

CASTINGS. *"Light Alloy Castings,"* by A. E. Cartwright, *The Metal Industry* (London), vol. 48, No. 24, June 13, 1941, pp. 511-512. This concluding installment discusses the differences between magnesium and aluminum alloys from the point of view of foundry practice, melting practice, fluxing, superheating, molding sands, gating and feeding methods. The author also stresses the importance of correct design. (Al.)

MANGANESE AND COPPER. *"The Alloys of Manganese and Copper: Vibration Damping Capacity,"* by R. S. Dean, C. T. Anderson and E. V. Potter, *Transactions*, American Society of Metals, vol. 29, No. 2, June, 1941, pp. 402-414. Preliminary measurements showed that certain manganese-copper alloys which possess a remarkable deadness or lack of metallic ring also have unusually high vibration damping capacity at low stresses. An instrument for the determination of this property is described and the results obtained with it using manganese-copper alloys are discussed. The results indicate that the high values obtained by certain heat treatments are due to the formation of ordered anti-phase nuclei in the mass of the alloy. The vibration damping capacity appears to reach a maximum with some critical distribution of these anti-phase nuclei and decrease as a state of equilibrium order is approached. The effect of cold work is to decrease the vibration damping capacity of the alloys as would be expected from its disordering effect. The unusually high vibration damping capacity of the quenched alloys drops with time, and it is suggested that it is due to their failure to come to an equilibrium volume when quenched. There would thus seem to be a similarity in structure with regard to its effect on vibration damping capacity between an alloy in a supercooled state and an alloy in a partly ordered state. In both instances, some of the atoms of the metal are not in the equilibrium positions required by the temperature. High vibration damping capacity appears to be an attribute of such metastable systems. (Al.)

MANGANESE AND COPPER. *"The Alloys of Manganese and Copper,"* by R. S. Dean and C. T. Anderson, *Transactions*, American Society of Metals, vol. 29, No. 3, September, 1941, pp. 788-801. The electrical resistance of manganese-copper alloys of 12.3-96.2 per cent manganese was determined at room temperature by the potential drop method. The alloys were hot-worked and then cold-worked to rods 0.25-in. square or round. Results of the quenched alloys show an interesting linear relationship between composition and resistance in the two ranges 10-40 per cent and 82-96 per cent manganese, cold working has little effect on electrical resistance in these two ranges but causes a considerable increase in the range 50-80 per cent manganese. Up to 40 per cent manganese no difference in resistance was found between quenched and slow-cooled alloys. Between 40-90 per cent manganese resistance lowers stepwise with composition on slow cooling. The steps appear at simple atomic ratios of manganese and copper. This suggests that on slow cooling ordered lattices has been formed the electrical resistance being a function of the particular lattice and independent of its composition. When alloys of 92-96 per cent manganese were quenched and reheated the electrical resistance showed a marked increase at 600 and 700°C. (1290°F.) The resistance on slow-cooling to intermediate temperatures and quenching is about the same as for the quenched alloys. Only on slow cooling to room temperature does the resistance drop. Apparently, in the higher manganese alloys a secondary decomposition takes place on reheating. The ratio of atomic per cent of manganese to density was a linear function of weight-per cent manganese within the composition ranges 10-40 and 82-96 per cent. Changes in lattice structures suggested by the results are discussed. (Al.)

MANGANESE AND COPPER. *"The Alloys of Manganese and Copper,"* by R. S. Dean and C. T. Anderson, *Transactions*, American Society of Metals, vol. 29, No. 3, September, 1941, pp. 802-812. The effect of heat treatment and cold work on the hardness of copper-manganese alloys of 12.3-96.2 per cent manganese is discussed. The quenched alloys increase in hardness with manganese content. High-manganese alloys harden very slowly with cold work, high-copper alloys much more rapidly. Heat treatment has little effect upon alloys containing less than 40 per cent manganese. Alloys of 40-75 per cent manganese begin to harden at 450°C., reach maximum hardness at 500°C., and soften progressively from 500 to 800°C. Above 75 per cent manganese the alloys behave quite differently toward heat treatment, showing maximum hardness at 600°C., accompanied by the separation of a second phase. Alloys containing more than 90 per cent manganese harden at a lower temperature. In high-manganese alloys the temperature and composition of maximum hardness depend upon previous heat treatment to such an extent that reproducible results are difficult to obtain. The rate of ordering may become the controlling factor in the rate and amount of hardening by precipitation. (Al.)

Cast Iron

BRAKE DRUMS. *"Brake Drums,"* by Oliver Smalley, *Foundry Trade Journal*, vol. 64, No. 1297, June 26, 1941, pp. 423-424, 427. The author discusses two brake drum tests; the first drums had the following analysis: T.C. 3.48; Si. 1.89; Mn. 0.94; P. 0.17; S. 0.104, and Mo. 0.75. The Brinell hardness ranged between 207 to 219. The surface of this drum after the test showed thermal checking; however, it showed an exceptionally good rating in resisting scoring. On the whole the irons of this analysis showed that while large quantities of graphite may help in improving the life of a brake drum against thermal checking, this is only true when the graphite is well distributed and is not in a massive and continuous form. In the second test a brake drum iron was made to the other extreme—with a total carbon of 3 per cent and having tensile properties approaching 18 tons per sq. in. The analysis was as follows: T.C. 3.03; Si. 2.09; Mn. 0.8; P. 0.104; and S. 0.068. The finest drums had a 217 Brinell. The graphite appeared in small, thin flakes or small nodules. This structure is typical of a dense iron of good tensile properties, and while it may be suitable for brake drums for aircraft service where high strength and shock resisting properties are necessary, it is not recommended for drums that must withstand excessive heat checking. (C.I.)

BRAKE DRUMS. *"Brake Drums,"* by Oliver Smalley, *Foundry Trade Journal*, vol. 64, No. 1295, June 12, 1941, pp. 387-388, 386. Basically a brake drum is part of a mechanism that converts energy of motion into heat. The amount of heat generated and the speed of dissipation of this heat are, therefore, the main factors that determine the life of any brake drum. The three major requirements that must be considered in the selection of a material for brake drums are initial cost, performance and service life. Initial cost must have direct relation to the expected service life. Performance covers design, heat-dissipation, coefficient of friction, type of wear surface developed and general maintenance of drum form during its operating life. The author also comments on structures and scoring. (C.I.)

DEFECTS. *"Cause of Pinholes and Some Related Defects in Enamel Coatings on Cast Iron,"* by C. A. Zapffe and C. E. Sims, *The Journal*, American Ceramic

Society, vol. 24, No. 8, August, 1941, pp. 249-256. The confusion in identifying hydrogen as the predominating cause of certain defects in enamel on cast iron has been due largely to the close association of carbon and hydrogen in cast iron and steel. The principal relation of carbide and graphite to enameling defects is the release of hydrogen from the carbon during enamel firing. The much-discussed "chill layer," therefore, is important chiefly because this layer often contains hydrogen that is bound to the carbon in the cementite. Experiments show that when hydrogen is absent, regardless of the depth or nature of the surface chill, no pinholing or blistering results during firing at 725°C. Sources of the hydrogen that cause the defacement are found chiefly in melting and in casting. The low oxygen pressure of molten cast iron favors hydrogen absorption. Moisture in the atmosphere, in the charge, or chemically combined in the rust on scrap provides the greatest quantities of the gas, and moisture and organic materials in the mold also are prolific sources of hydrogen for absorption by the iron. At ordinary temperatures, rusting is often harmful. Flushing the melt with a dry, hydrogen-free gas, such as nitrogen, removes the dissolved hydrogen, and defects during subsequent enameling will not occur unless hydrogen is obtained later from other sources. Chipping phenomena probably are caused chiefly by hydrogen effusion, just as are analogous defects in sheet-steel making. (C.I.)

PHOSPHORUS. *"High Duty Phosphoric Cast Iron,"* by Dr. J. E. Hurst, *Pig Iron Rough Notes,* No. 85, Summer, 1941; pp. 5-10. This is a brief discussion to help clear the way for the concentration of research and development of the production of high duty phosphoric iron castings since the conditions governing the production of sound castings in phosphoric irons have been established. The trend has been in the direction of low phosphorus materials, but new research is developing cast iron of higher phosphorus content. In a table prepared by British pig iron manufacturers, showing some thirty pig irons tabulated in the order of descending ultimate breaking strengths, medium and high phosphoric pig irons occupied high positions as well as low positions in the table. In the influence of phosphorus on the properties of hardened and tempered cast iron over a range of phosphorus content from 0.035 to 1.56 per cent, it was found that phosphorus in itself does not interfere with the facility for hardening and tempering cast iron. (C.I.)

SPECIFICATIONS—BRITISH. *"British Specifications for Cast Iron,"* by J. G. Pearce, *The Foundry,* vol. 69, No. 9, September, 1941, pp. 53, 136-139. There are six grades of iron covered in two specifications, 321 and 786, ranging from 9 to 26 tons per sq. in. in tension. Attention has been drawn to the gap between the highest grade in 321 and the lowest in 786; to the fact that the transverse strengths do not entirely line up with the tensile strengths, and to the fact that the lowest grade 786 is not normally accepted as high-duty iron. It has been pointed out that skin-machined transverse bars give a better result, that is, consistent result. The conversion of transverse breaking loads to rupture stress is widely followed. The use of deflection is discussed as being a good indicator of toughness but also shows changes in quality between various grades. In conclusion the author presents data on varying test bar size. (C.I.)

Heat Treatment

FURNACE ATMOSPHERE. *"Furnace Atmosphere Generation,"* by Sam Tour, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 693-709. In burning rich mixtures of fuel gas and air, the composition of the products of combustion from a given ratio of gas to air are found to be dependent upon the temperature of the combustion chamber. At low combustion chamber temperatures heavy soot deposits result and the gaseous products of combustion are low in hydrogen and carbon monoxide and high in water and volatile hydrogen carbons. At high combustion chamber temperatures coke deposits result and the gaseous products of combustion are high in hydrogen and carbon monoxide and low in water vapor. Very seldom are the reactions truly endothermic. They are usually true exothermic combustion reactions. An intermediate temperature range of 1600 to 1900°F. may be used where difficulties due to heavy soot or heavy coke do not develop. This range is wide enough to allow for a considerable variation in the gaseous products of combustion. Temperature control within this range gives uniform performance. Numerous methods of obtaining this temperature are described. (H.T.)

FURNACE ATMOSPHERE. *"Water Vapor in Furnace Atmospheres,"* by Sam Tour, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 710-731. Water vapor is one of the major products resulting from the combustion of fuel gas and air mixtures. The standard methods of gas analyses applied to furnace atmospheres give compositions of the gases as cooled to room temperature. During this cooling of the gases, the surplus water vapor is condensed to water and removed until the remaining gases are saturated at the temperature of analysis. Assuming that no other gas reactions take place during cooling, the results could be recalculated to correct for this loss of water if the total original amount of water were known. With certain simple fuel gases and known air-gas ratios, the total water vapor can be calculated. Results show that in some cases the actual water vapor content in the products of combustion of rich gas and air mixtures as used for heat treating furnace atmospheres may contain as much as 18 per cent water vapor. The over-all gas atmosphere composition is affected by the water vapor present. By cooling to remove water and then reheating, the composition may be caused to change. By removing water vapor and reheating, it is possible to reduce the amounts of residual hydrogen and carbon dioxide and increase the residual carbon monoxide. The carburizing or decarburizing tendencies of the furnace atmosphere gases can be influenced and controlled to a great extent by the dehydrating reheating and recirculating through the furnace of the gaseous products of combustion of rich mixtures of fuel gas and air. (H.T.)

See Alloy, Castings
See Alloy, Manganese and Copper

Metallography

STANDARDS. *"Metallographic Examination Standardized,"* by C. M. Cosman, *The Iron Age,* vol. 148, No. 4, July 24, 1941, pp. 33-37. Technological testing processes are very useful as a speedy means of checking during manufacture. The visual methods, metallography, X-ray investigation and magnaflux tests, afford the most useful means of interpreting the state of a material, to assess its usefulness and to prescribe a treatment which will fit it for the job. Visual tests are painstaking to report and not easy to interpret. To alleviate this difficulty, in Germany, a standard metallographic series has been compiled to give information regarding a variety of properties and the extent to which these are encountered in the material. Figures are designed to run in three groups: the first index gives a blanket classification, the second a subdivision within the group, and the last gives the degree of frequency or volume of the occurrence of the phenomenon defined by the preceding numbers. Thus, 1.023 means, 1 (blanket definition: inclusions); 1.02 (specific class: brittle oxide inclusions); 1.023 (strength or frequency 3, referred to as value number). Unalloyed structural steels, in the form of billets, slabs, shapes, etc.; free cutting steels; unalloyed and alloyed tool steels, were just a few of the materials investigated. (Te.)

Non-Ferrous

CASTINGS. *"Production of Non-Ferrous Castings,"* by R. F. Hudson, *The Metal Industry* (London), vol. 48, No. 21, May 23, 1941, pp. 447-449. In this article, centrifugally cast, chill cast, machine molded castings, monel and high phosphor bronze, and sand castings are dealt with. In this section centrifugal practice is mentioned first because the author believes it is the most modern, and if the design of the casting is suitable, will produce the nearest approach to a perfect casting. Chill castings are discussed next; they have much in common with spun castings, one being cast in a static mold while the other is cast in a revolving mold. The author's remarks are confined to a very brief description of the equipment. Both vertical and horizontal spinning are now quite widely used, vertical spinning being used primarily for gear blanks and other castings, while horizontal is used for bushes and liners. Variable speed machines are essential with the necessary flexibility to cover the wide range of dimensions and alloys required today. (N.F.)

CASTINGS. *"Production of Non-Ferrous Castings,"* by R. F. Hudson, *The Metal Industry* (London), vol. 48, No. 22, May 30, 1941, pp. 469-471. This is the concluding installment of the author's paper and deals with the casting of phosphor bronze, monel, silicon-monel and aluminum-monel. Numerous examples are given of the methods adopted for the gating of some of these alloys. (N.F.)

GATING. *"Gating Non-Ferrous Castings Is Important,"* by N. K. B. Patch, *The Foundry,* vol. 69, No. 7, July, 1941, pp. 58-59, 115-117. The first objective of a restriction in a gate is to set up a valve, or controlling point, in the gating system to establish a given rate of flow of metal and to hold back the inrush of metal from the sprue. It is necessary to hold back this inrush of metal so that the sprue may be held full during the pouring period; otherwise drosses and dirt may be carried down the sprue and later into the casting cavity to form defects. By the intelligent control of the size of the area, the control of flow into the casting can be established definitely for each and every size casting being poured and for each and every condition that demands a variation in

the speed of flow of metal. The restriction, controlling the speed of castings, should be located relatively close to the base of the sprue and at the same time far enough away from where the metal starts to flow into the casting cavity so that the stream will have quieted down completely to a steady flow and also located so as not to cause erosion. In instances where large quantities of metal are demanded it is best to use several sprues which are connected to one large basin at the top of the mold. The fact that restriction is going to retard the flow of metal means an additional effect to prevent erosion. Essential elements that constitute a proper restriction in the gate are, the reduction of the cross-sectional area of the gate to the desired size to insure the carrying capacity that is most desirable for the proper pouring of the mold; and the other is to avoid sharp changes in dimension. (N.F.)

MELTING. *"Proper Melting Decreases Non-Ferrous Foundry Losses,"* by R. J. Keeley, *The Foundry*, vol. 69, No. 9, September, 1941, pp. 56-57, 124-128. This article has related some actual experiences in non-ferrous metal melting which should be of interest to non-ferrous foundrymen. This article does not cover the entire field of non-ferrous but gives details of a few actual case histories in which certain principles of furnace operations were involved with the idea that some of these experiences might help in solving similar difficulties in other foundries. The details of these experiences are outlined, first, explaining the nature of the problem, and secondly, the corrective methods applied to eliminate the difficulty. These experiences involve natural-draft pit furnaces; open-flame oil furnaces; gas-fired furnaces of the open-flame and crucible types, and electric furnaces of the indirect arc and induction types. (N.F.)

TEST BARS. *"Making Non-Ferrous Test Bars,"* by N. K. B. Patch, *The Foundry*, vol. 69, No. 9, September, 1941, pp. 63, 141-143. In previous articles the question of the bar which is cast distinctly as an integral part of the casting itself was not discussed. Such a bar is part of the specifications for many of the cast bronze and brass alloys prepared by the federal specifications board and indicated as the bar to be cast as part of the casting when large castings are being produced. The problem of attaching these bars, or locating them where they will be capable of being removed without inconvenience and at the same time be representative of the metal in the casting is considered. So that this bar will not bleed the casting to a point where the casting is impaired physically, the bar should be located so that it is fed from a part of the casting which in turn is fed from some other source. An individually cast test bar with standard riser equipment is the surest and most dependable method of getting tests that will check with one another and may be relied upon to indicate the accuracy of control in the manufacturing process, so the author states. In conclusion the author discusses the variation of physical properties due to what part of the casting is used for the test bar, how to feed the casting and the need for three test bars. (N.F.)

See Alloy, Castings
See Alloy, Manganese and Copper

Phosphor Bronze

See Non-Ferrous, Castings

Phosphorus

See Cast Iron, Phosphorus

Pig Iron

CONSERVATION. *"Pig Iron Conservation," Canadian Metals and Metallurgical Industries*, vol. 4, No. 9, September, 1941, pp. 230-231, 234. This report is intended to help small foundries in the conservation of pig iron, it was prepared by the Ore Dressing and Metallurgical Laboratories, Bureau of Mines, Ottawa, Quebec, Canada. The report states that the pig iron shortage may be alleviated to some extent by substituting scrap iron for part of the pig iron requirements. In discussing preparations for use of scrap the importance of good melting practice, preparation of the cupola, lighting the cupola, weighing each charge, fluxing and uniformity of blast pressure are stressed. Thirteen different classifications of gray iron foundry scrap are listed and the correct selection of class of scrap to be used is discussed. In commencing the use of scrap in the cupola mixtures, it is best to begin with the replacement of a small amount of the pig iron content, possibly 2 or 3 per cent. This amount can be increased at regular intervals of two or three operating days, until such time as the maximum usable amount is reached. In calculating the mixture, it may be necessary, especially if the scrap to be used is small and light, to allow for a slightly greater oxidation loss of the silicon and the manganese contents. If considerable silicon and manganese are required in the base cupola mixture as calculated, and it is not possible to obtain these contents from the material on hand, these amounts may be increased by the addition of ferro-silicon and ferro-manganese. In the control of molten metal it is important that a standard routine test be carefully followed to eliminate variations due to temperature, time and other factors. The test pieces give good indication of the operating conditions in the cupola in addition to information on the characteristics of the metal. (M.H.)

Sand

SILICA FLOUR. *"Silica Flour Controls Molding Sand,"* by Harry W. Dietert and Gordon Curtis, *The Foundry*, vol. 69, No. 9, September, 1941, pp. 58-59, 133-135. Foundrymen have used silica flour additions in their steel molding sand for many years. Since silica flour or fines has such great influence on a molding sand, great care should be exercised in adding, or controlling, the exact amount of silica flour or fines present in a sand. A fraction of a per cent will change the room and high temperature working properties of a sand. As a proof for quick distribution of these facts, test data is presented dealing with the effect of silica flour additions to Southern bentonite and Western bentonite; placing emphasis on the high temperature properties of the sand and associating such casting defects as cuts, washes, blisters, hot tears, cracks and ease of shake-out with the percentage of fines contained in a sand. (Sa.)

See Alloy, Castings

Specifications

See Cast Iron, Specifications—British
See Non-Ferrous, Test Bars

Steel

BESSEMER. *"A Study of Modern Bessemer Steels,"* by E. E. McGinley and L. D. Woodworth, *Metals Technology*, vol. 8, No. 6, September, 1941, pp. 1-8. It is the purpose of this paper to review briefly the physical properties of Bessemer steels as contrasted with those of open-hearth steels, to discuss control measures now employed in the making of Bessemer steel, and to consider the advantages derived from the use of those control measures. The paper also attempts to contribute to the general store of knowledge, with the full realization that there is still much to be learned. The basic problems considered are the control of temperature, degree of oxidation and a better understanding of the fundamentals affecting nitrogen content. (S.)

CARBON AND GRAPHITE. *"Use of Carbon and Graphite,"* by F. J. Vosburgh, *Steel*, vol. 109, No. 11, September 15, 1941, pp. 66, 68, 176-179. Carbon and graphite are most unusual materials and the author herein describes in a brief way their manufacture and discusses some of their applications in the iron and steel industry in the light of better operating conditions and reduced maintenance cost. (S.)

CASTING PRODUCTION. *"The Production of Steel Castings,"* by C. H. Kain, *Foundry Trade Journal*, vol. 64, No. 1297, June 26, 1941, pp. 429-430. Pouring practice in relation to the use of plain ladles, teapot ladles, bottom pour ladle and shanks are discussed. Four methods of molding in common use by the British are green sand molding, dry sand molding, oil sand molding and compo molding. Compo is a specialized form of molding material developed especially used for large castings. It consists of a very strong mixture of refractory materials such as crushed firebrick, silica sand, carbon, old crucibles and other materials bonded with fireclay. The author concluded his article by presenting data on fettling, welding and heat treatment. (S.)

CHEMISTRY AND GRAIN SIZE. *"Surface Carbon Chemistry and Grain Size of 18-4-1 High Speed Steel,"* by W. A. Schlegel, *Transactions*, American Society of Metals, vol. 29, No. 3, September, 1941, pp. 541-622. Data are presented which show the relationship of time, temperature and furnace atmospheres to chemical changes which take place on the surface of 18-4-1 high speed steel during its heat treatment. These data apply, to a limited degree, to several special methods of heat treatment. The microstructures resulting from chemical changes on the surface were studied and photomicrographs are included to show the effect of these changes on structure. A study of grain size was made in conjunction with the study of surface carbon chemistry. The effects of time, temperature and heat treating atmosphere upon the resulting grain size of this steel were studied in a quantitative manner. (S.)

CREEP PROPERTIES. *"Some Creep Properties of 16 Cr.-13 Ni-3 Per Cent Mo Steel,"* by H. D. Newell, *Metals and Alloys*, vol. 14, No. 2, August, 1941, pp. 173-181. This article is an adaptation from a series of reports of the Babcock & Wilcox Tube Co. of an extensive investigation of a 16 Cr-13 Ni-3 per cent Mo as to its creep and other properties. The creep value of certain steels is highly important in applications at high temperatures—such steels must withstand severe treatment. (S.)

GRAIN SIZE. *"Effect of Rate of Heating Through the Transformation Range on Austenitic Grain Size,"* by S. J. Rosenberg and T. G. Digges, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 638-669. Data are presented to show how the rate of heating through the transformation range affects the austenitic grain size at various temperatures of high-purity alloys of iron and carbon, and commercial and experimental plain carbon steels. The commercial steels included heats produced under furnace practice that resulted in both controlled and noncontrolled grain size. In certain cases, the austenitic grain size of these alloys and steels was affected by the rate of heating through the transformation range, but all the materials did not respond in the same manner. (S.)

HEAT TREATMENT. *"A Balanced Protective Atmosphere—Its Production and Control,"* by J. R. Gier, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 670-692. This paper describes the production and use of a balanced protective atmosphere for controlling the surface carbon content of steels during heat treatment. A new device for measuring the relative carbon pressure of furnace atmospheres is described. Experiments are reported showing how this device can be used in preadjusting the composition of furnace atmospheres to chemical equilibrium with the carbon in any steel. (S.)

NITROGEN. *"Effect of Nitrogen on the Case Hardness of Two Alloy Steels,"* by S. W. Poole, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 764-787. A study has been made of the effect of nitrogen on the case hardness of two case hardened medium carbon alloy steels after drawing in a temperature range of 300 to 600°F. (150 to 315° C.). It was found that with a medium carbon nickel-chromium steel the effect of the nitrogen contents is to inhibit the softening effect on the case upon drawing in this temperature range. This effect also was indicated with a carbon-chromium steel. It was found that a sodium cyanide bath gave the best results insofar as high surface case hardness is concerned. The carbon-chromium steel was found to be generally superior to the nickel-chromium steel so far as maximum surface case hardness is concerned. A metallographic study revealed several interesting features concerned with the type of case structure formed and the formation of a carbide skin at the extreme surface of the case. (S.)

OPEN-HEARTH. *"Strategic Materials for Open-Hearth Operation — I," Industrial Heating,* vol. 8, No. 9, September, 1941, pp. 992, 994, 996. This is a discussion on the methods of conserving manganese in steel production. Manganese is important in steel production from both the specifications and quality standpoint. For the expected tonnage this year the steel industry will need 1¼ million tons of manganese. Consequently it will be necessary for the steelmaker to lower his own specifications, and to ask his customers to do the same. A five-point decrease in manganese content of all the sheet and strip made would reduce the consumption about 2 per cent. The use of spiegel is commented on and numerous other items are presented concerning this important subject of manganese conservation. (S.)

OPEN-HEARTH. *"Use of Amorphous Graphite in the Open-Hearth Shop,"* by R. J. Zemanek, *Steel,* vol. 109, No. 2, uly 14, 1941, pp. 71, 74. Shortage of pig iron has forced many steelmakers to swing over their open-hearth shops from cold metal charges to all steel scrap heats. The changeover has been effected by the use of graphite, which is one of the most efficient and economical sources of carbon for making high-quality steel. The method of adding this material is explained in this article. (S.)

PRECIPITATION HARDENING. *"Precipitation Hardening Effects in 'Plain' Ferritic Steels,"* by H. W. Gillett, *Metals and Alloys,* vol. 14, No. 2, August, 1941, pp. 161-165. The regulation heat-treatment methods and results so occupy men's minds in usual consideration of the treatment of steel that some secondary phenomena are obscured. Yet some of these apparently minor factors may have a real bearing on the final results. Precipitation hardening is generally thought of in relation to nonferrous alloys or to some complex and highly alloyed ferrous alloys. Actually the every-day steels appear subject to the precipitation-hardening type of phenomena. The author discusses some tests he conducted on 0.10 to 0.12 per cent carbon with varying aluminum content and another series of tests conducted on 0.10 to 0.12 per cent carbon with 0.005 to 0.04 per cent aluminum; he also comments on the behavior of a rimmed open-hearth steel. In conclusion data on the proper deoxidation and heat treatment, precipitation effect of impurities, variation due to segregation and quench hardenability are presented. (S.)

Testing

METALS. *"Physical Testing of Metals,"* by Dr. G. E. Wiley, *Canadian Metals and Metallurgical Industries,* vol. 4, No. 8, August, 1941, pp. 196-201, 204. In the treatment of metals, the ultimate object is the production of metals capable of useful application. When a metal is to be under some physical stress the mechanical properties must be studied, and its response to applied force determined. Chemical properties will determine whether or not the metal will resist corrosion. For the study of solid metals numerous methods are employed. Some are used to investigate changes that take place in a metal as it solidifies and cools to atmospheric temperature. Other methods are applied to examine the metal as it exists at ordinary temperatures. The latter methods are most prevalent, and the most direct information is obtained by chemical analysis, X-ray and microscopic examination. The complete chemical analysis will tell the proportion of the various elements which are present in any given sample. Through X-ray the disposition of the elements in their individual crystal lattice may be determined, while microscopic examination shows how the individual crystals are arranged in the sample. In addition there are other tests which give less direct information about the properties. This includes mechanical tests, such as tensile and hardness determinations, measurements of magnetic and electrical properties, *e. g.* hysteresis curves, and determination of specific volumes. Other apparatus has been built which will sort out metals of different chemical analysis by means of the change in their magnetic properties; or metals of identical chemical analysis may be shown to have different magnetic effects because of different structure. (Te.)

See Cast Iron, Brake Drums
See Cast Iron, Specifications—British
See Non-Ferrous, Test Bars
See Washes, Core and Mold
See X-ray, Deformation
See X-ray, Technique

Washes

CORE AND MOLD. *"Mold and Core Washes,"* by Wm. Y. Buchanan, *Foundry Trade Journal,* vol. 65, No. 1305, July 31, 1941, pp. 73-75. The material used in manufacturing blacking is coke breeze, the base material, and possibly some additions of fireclay. Other materials such as bentonite, dextrine, semi-solid core oil and even crude oil are a few of the ingredients used by the author in making blacking. In describing mixing the mechanical, wet grinder and emulsifier type mixers are discussed. In commenting on the methods of testing blackwash the author states that the specific gravity bottle test takes much longer than the measurement by hydrometer but provided that it is done carefully the figures are accurate but are extremely insensitive to heavy additions of solid material to the blackwash. (Sa.)

X-Ray

DEFORMATION. *"X-Ray Diffraction and the Deformation of Metals,"* by W. A. Wood, *Journal of Scientific Instruments,* vol. 18. No. 7, July, 1941, pp. 153-154. A brief survey is made of the principal changes in structure of a metal during deformation which are brought out by application of X-ray diffraction methods. Reference is made to the changes associated with the yield point, to the principle of the lower limiting crystalline size, and the subsequence into which these structural changes fall. A brief sketch also is given of the behavior of the atomic lattice of a metal under tensile stress, and of the characteristics of the lattice stress-strain diagram. (Te.)

TECHNIQUE. *"The Technique of Microradiography and Its Application to Metals,"* by G. L. Clark and W. M. Shafer, *Transactions,* American Society of Metals, vol. 29, No. 3, September, 1941, pp. 732-754. Since it is impossible to magnify X-ray images in the same sense that optical images are magnified by suitable lenses, it is necessary to register the X-ray image on a photographic plate and then enlarge the photographic image. By the use of the Lippman emulsion with extreme fine grain size for the silver halide a magnification up to 200 may be made without loss of detail from graininess. Successful radiography also depends upon the choice of X-ray wave length which will give a maximum differentiation between constituents in a specimen such as aluminum and copper in an alloy. In this paper the theoretical absorption equations are developed leading to a simple and practical technique for metals. A careful study was made of photographic emulsions and developers. Instead of employing very soft X-rays at a few thousand volts with attendant prolonged exposure time very successful results were obtained with characteristic X-rays of molybdenum, copper and iron as produced in ordinary diffraction apparatus. A camera for multiple exposures is described and results are reported for copper-aluminum alloys, brass, type metal and graphitic steel. It is demonstrated that, supplementing the microscope, microradiography has great metallurgical usefulness with the advantages that it gives a three-dimensional view, different absorbing

power of constituents or inclusions, is directly and incontrovertibly interpreted, reveals internal voids and cracks, and requires no special polishing or preparation of the specimen. A semi-microradiographic technique for examination of very small welded pieces for soundness also is reported. (Te.)

Statement of Ownership

Statement of the ownership, management, circulation, etc., required by the acts of Congress of August 24, 1912, and March 3, 1933, of *American Foundryman*, American Foundrymen's Association, published monthly at Chicago, Ill., for December 1, 1941. State of Illinois, County of Cook, ss. Before me, a notary public in and for the State and county aforesaid, personally appeared R. E. Kennedy, who, having been duly sworn according to law, deposes and says that he is the Editor of the *American Foundryman*, American Foundrymen's Association, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, to-wit: 1—That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, American Foundrymen's Association, Inc., Chicago, Ill.; Editor, R. E. Kennedy, Chicago, Ill.; Managing Editor, N. F. Hindle, Chicago, Ill.; Business Managers, None. 2—That the owner is American Foundrymen's Association, Inc., not for profit; stock, none. Principal Officers, H. S. Simpson, President, c/o National Engineering Co., Chicago, Ill.; C. E. Westover, Executive Vice President, Chicago, Ill.; R. E. Kennedy, Secretary, Chicago, Ill. 3—That the known bondholders, mortagagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None. 4—That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him. R. E. Kennedy, editor. Sworn to and subscribed before me this 23rd day of Sept. 1941. (Seal) Jennie Reininga, Notary Public. (My commission expires Feb. 9, 1942.)

November Chapter Meeting Schedule

November 3

Central Indiana
Washington Hotel, Indianapolis
E. E. Woodliff,
Harry W. Dietert Co., Detroit
"Sand Behavior in the Mold"

Metropolitan
Essex House, Newark, N. J.
Max Kuniansky
Lynchburg Foundry Co.,
Lynchburg, Va.
"Scrap Metals for Making High Quality Castings in the Cupola"

Western Michigan
Hotel Occidental, Muskegon, Mich.
Moving Picture—*"Foundry Sand"*
Short Subjects

November 7

Western New York
Hotel Touraine, Buffalo
R. F. Lincoln, Osborn Mfg. Co.,
Cleveland
"Molding Machines and Core Machines"

November 10

Chicago
Top of the Town Restaurant
J. F. Modrall, Eli Lilly & Co.,
Indianapolis
"Merit Rating Plan"

November 11

Cincinnati District
Union Terminal Restaurant, Cincinnati
J. W. Bolton, Lunkenheimer Co.,
Cincinnati
"Practical Approaches to Some Non-Ferrous Foundry Problems"

Michiana
Hotel LaSalle, South Bend, Ind.
A. W. Gregg, Whiting Corp.,
Harvey, Ill.
"Cupola Practice"
Moving Pictures

Northern Illinois-Southern Wisconsin
Hotel Faust, Rockford, Ill.

November 13

Northeastern Ohio
Cleveland Club, Cleveland, Ohio
B. H. Booth
Jackson Iron & Steel Co., Jackson, Ohio
"Metallurgy and Silvery Iron"

St. Louis District
DeSoto Hotel, St. Louis
D. J. Reese, International Nickel Co.,
New York City
"Cupola Practice"

November 14

Central New York
Onondaga Hotel, Syracuse
John Lowe
Battelle Memorial Institute,
Columbus, Ohio
"Casting Defects—Causes and Remedies"

Northern California
Alexander Hamilton Hotel,
San Francisco
F. B. Riggan, Key Co.,
East St. Louis, Ill.
"Hot Strength Control of Cores"

Philadelphia
Engineers Club
"Raw Material Supplies"

November 17

Quad City
Blackhawk Hotel, Davenport, Iowa
C. V. Nass, Fairbanks Morse & Co.,
Beloit, Wis.
"General Non-Ferrous Foundry Practice"

Twin City
Midway Club, St. Paul, Minn.
A. W. Gregg, Whiting Corp.,
Harvey, Ill.
"Cupola Operation and Mechanical Charging"
F. B. I. Agent

November 18

Southern California
Scully's Cafe, Los Angeles
"Cupola Operation"

November 21

Birmingham District
Tutwiler Hotel, Birmingham
F. B. Riggan, Key Co.,
East St. Louis, Ill.
"Sand Control"

Wisconsin
Hotel Schroeder, Milwaukee
Gray Iron—*"Design of Castings,"* by R. A. Beckwith
Malleable—*"Proper Design of Casting and Its Effect on Foundry Problems,"* by J. A. Durr
"Graphitization Problems in Malleable Iron," by J. H. Lansing
Steel—*"Welded Steel Castings"* by B. Koch
Non-Ferrous—*"Scrap Clinic,"* by C. V. Nass

November 27

Detroit
Pontiac Motor Div., General Motors Corp., Pontiac, Mich.
Omer Allen and Staff
"Foundry Operations"

November 28

Ontario
Royal Connaught Hotel, Hamilton
Gray Iron—J. Stavert
Malleable—R. Y. Yates
Non-Ferrous—O. W. Ellis

Apprentice Meetings

November 14

Birmingham Chapter
W. Lee Roueche, Sr.
McWane Cast Iron Pipe Co.
"Cupola Operation"

November 28

Birmingham Chapter
Tom Bellsnyder,
Jefferson Foundry
"Gating and Risering Gray Iron Castings"